The Builder.

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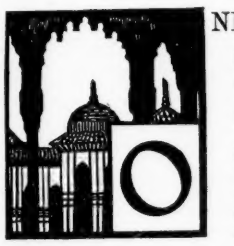
The Trade Union Congress.



ONE of the most striking features of the Trade Union Congress was the studied moderation of the President's address. Forty years ago, when the first Congress was held, thirty-four delegates attended, representing 118,367 members, but at Bath on Tuesday the President was addressing 521 delegates, representing 1,700,000 members; and seeing that he was addressing them at a time when the trade unions have every reason to congratulate themselves on the consideration extended to them by the Legislature, and when heads might easily be turned, the moderation and good sense displayed in the Presidential address is the more commendable, and it is to be hoped the example thus shown will not be lost upon his hearers.

It is further noticeable that the subjects dwelt upon in the address were more or less subjects which are properly within the sphere of trade-unionism, as distinguished from the Socialistic propaganda which have too often been aired on these occasions. With the dissensions in the Labour Party we have no intention of dealing, and the President appears wisely to have ignored them, but this much may be said—that if the trade unions wish to continue their recent successes and to retain the sympathy of outsiders, it is essential that they should confine themselves to matters strictly within their province, to the exclusion of purely political discussion. The compulsion brought to bear on all workers to join the unions will only be tolerated as long as the trade unions confine themselves to matters affecting the various trades and labour conditions; but coercion to gain purely political ends and to forward Socialism must inevitably lead to dissensions and a struggle for political freedom.

The President's observations on the number of unemployed, and the conditions of labour in this connexion, were peculiarly apposite. He explained the folly of combating the introduction of labour-saving machinery, and he advocated a spirit of brotherhood amongst the working classes themselves. We fear this side of Socialism is often overlooked—the doctrine is adopted largely by those who already "have," with the hope of obtaining more, and that out of somebody else's pocket. Thus the idea of limiting overtime owes much of its popularity to the consideration that it may be a means of raising the wages of those already in employment, and we imagine that the President's suggestion that it should be adopted to assist the "weaker brethren"—those out of employ—will present a new view of this question to many. The distinction he drew between overtime in certain trades necessitated by uncertain conditions of weather, such as exist in the building trade, and overtime adopted as a regular thing in some trades under normal conditions, also appears to be well conceived.

The main plank in the future policy of the Congress is Old Age Pensions, and on this subject we fear we cannot equally approve the sentiments of the President as expressed in his address. He endorsed the trade union contention that any scheme to be satisfactory must be non-contributory and non-discriminatory—in other words, a scheme to pauperise the working classes. It was unfortunate also that to support his views he instanced the Army and Navy and Civil Service pensions, as he apparently overlooked the principle of deferred pay which comes into operation in these services, and which has formed the basis of those schemes which have been recommended to secure Old Age Pensions, and which the trade unions declare off-hand to be unsatisfactory. The working classes have of late years not only secured a very considerable direct increase of wages, but the spending power of these wages has been much increased by relief from burdens which other classes are either unwilling or unable to obtain from others. Thus free education, compensation for accidents, and other benefits have been accorded, and yet the contention of the able-bodied workman—according to the views expressed by the unions—is that each man should spend his whole income upon himself, leaving the State not only to assist his family but also to support him after the age of sixty, however improvident he may have been. The enormous annual sum demanded for such a purpose alone places it out of the range of practical politics, but we think the self-respect of the working classes should

prove even a greater obstacle to the adoption of a scheme so crude in its conception. Those interested in this question and who have the subject really at heart cannot do better than study the recent practical suggestions put forward by those well qualified to devise a scheme, and published in the *Times* on September 3.

The delegates at Trade Union Congresses are always apt to talk as if there were a goose somewhere laying unlimited golden eggs, but when driven to define its habitat they have to content themselves by pointing vaguely to the land, the mines, or the railways, oblivious of the fact that labour is already obtaining its full quota from such sources. That unlimited external aid cannot be procured without corresponding drawbacks has already been exemplified by the working of the Workmen's Compensation Acts. The trade unions themselves are beginning to discover where the shoe is likely to pinch, and deplore the fact that men who have passed the prime of life and those who are infirm are now handicapped in obtaining employment. The Departmental Committee suggested a means for obviating this evil, but in the passage of the recent Act through Parliament these means were scouted by the trade union representatives, and the result has been that the less able-bodied men who it was suggested might obtain employment were they to be employed on less onerous terms as to compensation, are now being left with neither employment nor compensation.

Similar drawbacks are likely to attend the carrying out of the policy which forms another part of the trade union programme—the limitation of the working day in mines. A Departmental Committee has reported also on this question, but a measure is likely to be hurried through without due consideration to the results which may follow.

If the experiments advocated by the unions in practice turn out a failure it is to be observed that it is not those who have advocated the reforms who are content to bear the burden. If, as a consequence, men are thrown out of employment, or if older men fail to obtain work under the altered conditions, or if wages fall, some other relief has to be extorted from the tax or rate payers to provide for the sufferers.

We have had occasion repeatedly to point out that the trade unions have most excellent organisations as friendly societies, and this department of their work is carried on with a strict regard to economic and business conditions. If the unions will allow this part of their organisation fair play, if the machinery they have thus created can be placed at the service of the State, and the spirit of self-help which has made these societies what they are can be maintained, much may yet be done to alleviate the condition and assist the old age of that most deserving section of the community—the self-respecting worker. On the other hand, if the trade unions, relying on the existence of imaginary funds to be exploited, encourage their members in a policy which will sap their independence and tend to pauperise large numbers, then it is not difficult to foresee that the trade of this country will seriously suffer, that wages will fall, and that the inevitable result must be that many of the advantages already gained will be lost, and that the working classes in common with the whole nation will suffer degeneration.

NATURE AND ART IN THE GARDEN.

WHEN Mr. Crawford, in "Mansfield Park," lost his way coming home from hunting, and found himself unexpectedly at Thornton Lacey, the seat of his friend Edmund Bertram's future clerical ministrations, he congratulated the latter on having at least five years' work to do before the place was "live-able." His sketch of what would have to be done gives a good idea of the kind of programme probably often proposed in the days when the teaching and authority of Repton was only just beginning to efface that of Capability Brown :—

> "The farm-yard must be cleared away entirely, and planted up to shut out the blacksmith's shop. The house must be turned to front the east instead of the north—the entrance and principal rooms, I mean, must be on that side, where the view is really very pretty; I am sure it may be done. And *there* must be your approach—through what is at present the garden. You must make a new garden at what is now the back of the house; which will be giving it the best aspect in the world—sloping to the south-east. The ground seems precisely formed for it. I rode fifty yards up the lane between the church and the house in order to look about me; and saw how it might all be. Nothing can be easier. The meadows beyond what *will be* the garden, as well as what now *is*, sweeping round from the lane I stood in to the north-east, that is, to the principal road through the village, must be all laid together of course; very pretty meadows they are, finely sprinkled with timber. They belong to the living, I suppose. If not, you must purchase them. Then the stream—something must be done with the stream; but I could not quite determine what. I had two or three ideas."

The dictum that the meadows must be "all laid together"—*i.e.*, the hedges removed, is a reminiscence of Brown's teaching, with whom the great thing was to have as much open land as possible. The new garden would no doubt have been laid out in winding walks with knots of shrubbery to conceal one part of the walk from another; and as to the "two or three ideas" about the stream, there is no doubt that one of them would have been to dam and bank the stream up so as to make an artificial water to be dignified by the name of a "lake," for that was what streams were then supposed to be chiefly good for—to furnish artificial lakes which were to look as natural as possible. We can quite fancy we see Thornton Lacey after the alterations had been made and the house "turned round." Nothing is said, however, of anything like a design of the garden to assimilate it to the building. It was not art or design that was wanted, but respectability—to give it the look, as we learn on the next page, of a "gentleman's residence," something above the mere "parsonage," which was evidently not considered to come into the former category. To this end the important points evidently were that the house should look towards the best prospect, that there should be no hedges cutting up the land, and that any incongruous surroundings should be planted out.

In Rea's "Flora, Ceres, and Pomona," in the middle of the XVIIth century, the idea seems to have been exactly the contrary; instead of open spaces the house of every gentleman, "or person of considerable fortune and ingenuity," should have two gardens divided by a wall, but "both of these for delight, pleasure, and entertainment": and he goes on oddly enough to define the sizes proper for a nobleman or a simple gentleman; for the former, 80 yards square for the first garden and 30 yards square for the flower garden, while the gentleman should be content with enclosures of 40 and 20 yards square respectively. These comparatively small enclosed spaces were of course intended to be laid out in a highly artificial manner as formal gardens.

The two programmes represent the two most opposite views of the objects of a garden in connexion with a house. The object of the more modern one is display and an appearance of spaciousness; the object of the XVIIth century programme evidently was quiet and private enjoyment of a *hortus inclusus*, laid out in an artificial manner within geometrical boundaries.

Landscape gardening of the realistic school, consisting essentially of an artificial imitation of natural freedom and irregularity, is discredited now, and it has been recognised that if a garden is to form part of the surroundings of a house it should be artifically laid out with a reference to the plan and design of the house. Mr. Mawson's book on the laying out of gardens,* which has now reached a third edition, seems to recognise a kind of intermediate position. He gives a good many plans in which a portion of the garden at least is laid out formally in relation to the house; but he is not above the employment of walks in artificially contrived sinuosities, and one of the earliest of his plans of house and garden (No. 8) shows not only this feature, but also a quasi-natural lake apparently formed by damming up the water of a natural rivulet to fill part of a hollow in the ground. As the extreme length of this "lake" is only about 170 yards, it can have none of the effect of a large piece of water, and is merely a large pond of ragged outline. Now, an irregular piece of water of these small dimensions has no dignity, more especially when one sees that it must be, for all its irregularities, an artificial creation; whereas a pond or basin of this size treated geometrically would have a fine effect and would form an important decorative feature in the scheme. A piece of water treated *au naturel*, or left in its natural state, is of no value to a garden scheme unless it is really on a scale which justifies its being called a "lake," which implies of course that the extent of the site is very large, and that we are dealing with a park rather than a garden. A small piece of water, such as may be comprised in a garden, requires to be treated symmetrically as an artificial basin; otherwise it is merely a "pond," and looks mean rather than stately.

And this reasoning applies, as it seems to us, to the whole subject. A garden, in short, is either natural or artificial. We may have the typical English cottage

* "The Art and Craft of Garden Making." By Thomas H. Mawson, Hon. A.R.I.B.A. Third edition, revised and enlarged. London: B. T. Batsford. 1907.

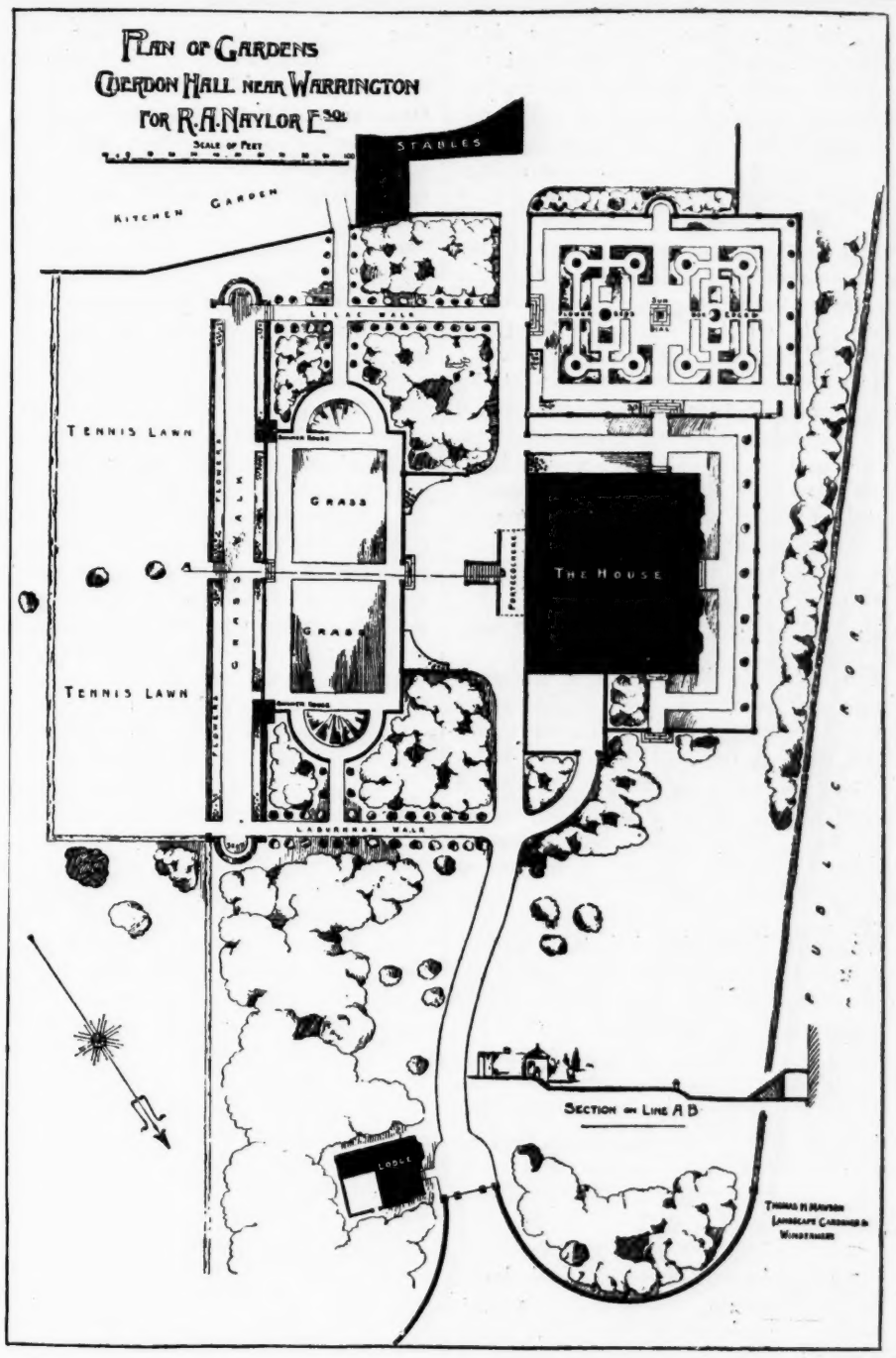
flower garden, in which, except for the walks necessary to get about it, the flowers are left to grow in wild profusion; or we may have the formal garden laid out on a preconceived design; but we cannot have the mock-natural, which in fact always betrays itself. The photograph of "Rocky Stream and Bridge, Ballimore," for instance, looks at once like a piece of made picturesque, with the bridge inserted to be looked at. So with other devices; openings in the plantations to allow a special view to be seen from a particular window, for instance; one can always see that they are contrived. A deliberately planned avenue of trees is another matter—there the art is obvious and there is no pretence of it being a natural arrangement. But thinnings cunningly made so as to persuade the spectator, if possible, that they are the result of natural causes, never take any one in; and it is the same with all these contrivances in would-be natural scenic effect.

For similar reasons, we cannot see that "Planting for Landscape Effect," which is the subject of one chapter in Mr. Mawson's book, is anything else than an illusion. Various photographs of clumps of trees are given, supposed to illustrate special effects, concerning which we can only feel that a dozen other arrangements, in these cases where there is no attempt at anything formal, might have been equally agreeable and effective. Of the two views given in illustration 175, entitled "Lombardy Poplars Appropriate and Inappropriate," we could not guess on merely looking at the plate, which is the "appropriate" and which is not. We find the author's view is that a single such poplar, or a group of three, standing up above a growth of lower trees, is appropriate, but that a long row of them is inappropriate. We do not see why. Both may be beautiful. Cowper, a true lover of nature, laments the removal of poplars so arranged:—

> "The poplars are gone—farewell to the shade,
> And the musical sound of the cool colonnade."

As long as trees are left in their natural form, not clipped into artificial forms (which of course cannot be done with large trees), they will have a way of looking pleasing in all sorts of arrangements of planting; in their natural form they belong to Nature, and Nature has her own laws of beauty, and will not be interfered with. The only point we notice as a really practical one in regard to planting trees is that it is better to mass one kind than to deliberately mix different kinds; and this is only conforming to the general habit of Nature; the same soil and circumstances are apt to bring about the growth of the same kind of tree. Planting trees only becomes really a part of the art of garden-making when masses are arranged on an entirely and confessedly symmetrical plan, of which radiating avenues are perhaps the only possible and successful system. Except in this case, we do not believe planting which is artificially carried out and yet intended to look natural can be reduced to any rules or recipes. It is doubtful if the trees will even grow as you want them; and they will perhaps look better if they do not.

It is only with the smaller growths, such as flowers and small shrubs, which



can be artificially grouped and pruned, and confined with definite borders, that a real art of garden-making comes in. And here the art is naturally combined with that of architecture as displayed in the house. Mr. Mawson is quite sound on this point. "A garden," he observes, "should always have a cared-for appearance; a slovenly ill-kept garden is as bad, if not worse, than none at all." A garden ought to be regarded as "serving the double purpose of foreground to the landscape when seen from the house, and as a base or setting to the house when viewed from the surrounding country." A good many of the plans of houses with the gardens immediately connected with them are exceedingly good, and illustrate the architectural relation of the garden to the house very well. We give a reproduction of one of them, a scheme designed for the remodelling of the gardens at Cuerdon Hall, near Warrington. Apparently (if we understand rightly) this was never carried out, the garden having been before laid out in the "landscape style," and the owner preferring to leave it so. In the remodelling scheme the necessity for making the main drive pass entirely across the centre of the site was the chief difficulty; and it was felt that for the carriage space in front of the main entrance "an enclosed court was the only form it could take consistently with the privacy of any part of the grounds." From this enclosure a gate on the axis of the house entrance leads to a long court with two grass lawns ending in circular bays. Across this we pass into a grass walk parallel to the enclosure, and thence into the tennis courts. The scheme rather recalls Rea's idea of the two enclosed gardens. Under the circumstances it is a very good one.

On the subject of clipped hedges there are some good remarks in regard to the various sections that may be adopted, of which No. 164, slightly battered at sides but with a flat top, is the best. The section spreading outwards from the bottom, and with a wide flat top, is not desirable and does not look well.

Mr. Mawson deprecates bushes clipped to the form of animals and birds, which we also think most objectionable, except where they already exist in an old garden, when it is a matter of interest to keep them up, as a legacy of the past. On the other hand, we object equally to the pincushion-shaped bushes cut into

geometrical surface panels, or into "Home Sweet Home" in raised letters, which the author seems to approve, but which to our mind are conceits that are not worth the trouble of fashioning, and are out of keeping with the true nature of vegetation. We cannot approve of any artificial clipping (in new work) except just so far as to give a hedge or a bush definite architectural form to harmonise with the general architectural treatment of the garden. Anything beyond that is questionable taste.

The illustrations given of some of the strictly architectural features connected with a garden, such as summer-houses, balustrades, stone seats, etc., are unobjectionable and are better than are generally found in books of this class; but they are rather commonplace, with the exception of the very well designed boundary wall at "The Hill, Hampstead" (No. 245), which is the best thing of the kind in the book.

The extensive lists given of different plants and trees, their characteristics and the circumstances and treatment under which they thrive best, are really valuable; but these belong to the part of the subject which comes under the head of the "craft" of gardening, and are hardly within our province, which is concerned only with the artistic phase of the subject.

We could have wished that the author had made less attempt at what is supposed to be fine writing (not always quite grammatical); a pretentious style adds nothing to the value of a book of this kind, and simplicity of expression is in much better taste. But in the main this is a useful and able book on the subject of which it treats.

NOTES.

The Indiscriminate Worship of Wren.

AMONG the published documents which the recent excitement about St. Paul's has called forth is a long confession of faith by Mr. Somers Clarke, who held for some time the post of Surveyor to the Dean and Chapter, and who tells us that the mighty sham erection of the upper portion of the exterior walls, with vacuity behind them, was necessary to afford sufficient abutment to the supports of the dome, and was carried out with that object! We fear we cannot accept Mr. Clarke's dictum on this head. That incidentally the portions of this wall near the crossing do act as counterforts is obvious enough; but to suggest that Wren deliberately erected a sham story with an order of pilasters, along the whole length of the church, with this purpose only, is not saying much for his perception of the relation between cause and effect, and is an almost absurd ignoring of the whole influence of the Late Renaissance spirit in regard to architecture. Wren was a born architectural genius, who would have made his mark in Mediæval architecture had he lived three or four centuries earlier; but living in the Late Renaissance period he could not entirely rise above its influences; and his real merit has never been so well or so pithily set forth as in Mr. Lethaby's concentrated phrase, before quoted in these pages, that "he understood exactly what could be done with the Renaissance box of bricks." There never was a happier characterisation; it is the truth in a nutshell; and the upper story of St. Paul's is emphatically something out of the box of bricks. Nor can Wren's cone and lantern be defended except on engineering grounds. It is quite true, as Mr. Clarke says, that Wren did not copy St. Peter's; it would have been better if he had in that particular. That noble lantern on St. Peter's impresses one not only by its fine outline and proportion, but by the fact that we know that the dome is a real masonic structure which actually carries the lantern. Wren's cupola and lantern are charming in external composition; but when we know that the outer dome, which seems to carry the lantern, could all be removed and the lantern stand just the same, it is impossible to feel quite the same architectural respect for it. Wren was quite great enough as he was, without trying to make out that he was immaculate and a summary of all architectural excellence. Indiscriminate worship is not a wise attitude of mind, nor the best compliment to the object of the worship.

Vauxhall Bridge.

TWO OR three of Mr. Alfred Drury's bronze figures in relief are now in position within the panels intended for them on the face of the piers of Vauxhall Bridge. There are to be eight in all, four on each face of the bridge. It is, however, very difficult to see them unless one hires a boat on purpose; the London County Council steamers apparently do not run as high as Vauxhall; and the river banks are so entirely occupied with enclosed wharfs that no view of them can be got from the banks except by the permission of a wharf-owner to enter his premises. This consideration almost leads to a doubt whether it was worth while to introduce sculpture on the bridge where it can only be seen by the Thames bargemen. As far as we could judge by looking from one of the wharfs (by the courtesy of the owner) the figures have a good decorative effect, but we should be inclined to say that they would have been still better and more in keeping with their position within a low relief panel if they had also been in rather lower relief; they seem to stand out from the panel too much. But it was difficult to form a judgment from so unsatisfactory a standpoint.

New Railway Viaducts in Cornwall.

OWING to the widening of the Great Western Railway throughout Cornwall several new viaducts and bridges have already been built, as previously recorded in our columns. A section of the line now in course of being widened is that which runs for nearly five miles along the bank of the River Lynher, and crosses several deep valleys by means of high timber viaducts. The new track runs parallel to the old line for about 1½ miles beyond Saltash, and then takes a more direct route to St. Germans, shortening the distance by a quarter of a mile, and effecting a considerable improvement of the gradients. Three important masonry viaducts have been built across the Forder, Notter, and Tiddy Rivers, these structures comprising thirteen, nine, and eight arches respectively. After the opening of the new line the last of the old timber viaducts in Cornwall will have been superseded, and on completion of the masonry viaduct over the Deadlake Valley, Plymouth, no timber structures of the kind will remain on the Great Western route to Penzance. We understand that the company do not at present propose to widen Brunel's celebrated bridge at Saltash, or to build a second viaduct across the River Tamar to carry an additional line of rails. Consequently there will still remain a single track section between Paddington and Penzance, a feature which the company would do well to abolish at the earliest possible date.

Extraordinary Traffic.

IN our issue for August 24 last we commented upon a recent decision relating to the time within which proceedings must be brought to recover expenses incurred in respect of extraordinary traffic under sect. 12 sub-sect. 1 of the Locomotives Act, 1898. That sub-section provides that proceedings shall be commenced within twelve months of the time at which the damage has been done, or where the damage is the consequence of any particular building contract or work extending over a long period, not later than six months after the completion of the contract or work. The Court of Appeal have considered this question in the case Lancaster Rural Council *v.* Fisher and Le Fanu (current "Law Reports"), and the decision is of some importance to builders and contractors. The damage complained of was occasioned by the haulage of certain pipes which were being laid by the defendants under a contract with the Manchester Corporation, which contract contained a maintenance clause leaving the work at the risk of the contractors for twelve months after it was completed and tested. The haulage of the pipes was completed by the end of July or beginning of August, 1904, the whole undertaking was completed by October 31, 1904, and the writ was issued May 20, 1905. The question raised was whether the maintenance clause was or was not to be taken into consideration for the purposes of the sub-section. And the Court of Appeal held that, assuming this to be a building contract, as the judge in the Court below had held that it was, the whole contract could not be regarded, but that the time ran from the completion of the work which caused the damage. The claim was, therefore, limited under the first part of the sub-section to such damage as had been done within twelve months of the issue of the writ.

The "Gladwell" Dustless Road System.

A COMPARATIVELY inexpensive system of making waterproof and dustless roads is that which has been employed with considerable satisfaction in the Eton neighbourhood by Mr. Gladwell, the Engineer to the Rural District Council. In one important respect the method of construction differs from that generally adopted by engineers who seek to prevent the penetration of water and the manufacture of dust by applying tar or kindred substances to the surface. Instead of attempting to bind and preserve the metal with the aid of a preparation which

has to be worked downwards, Mr. Gladwell uses granite chippings treated with a species of tar from which the light oils have been separated, and covers the tarred bed with granite macadam. The theory, and we believe the practical effect, is that by the pressure due to rolling the tar works up from below into the voids between the particles of macadam, binding the whole into a compact mass. Experience at Eton shows that the surface is quite satisfactory, and that roads made in the way described actually cost less, when maintenance is taken into account, than macadam roads, where the so-called binding materials are simply dust and water. A section of the Headlands-road at Liversedge, Yorkshire, has recently been made on the Gladwell system, with the result so far that the local engineer is satisfied that all the claims of the inventor have been realised. The system clearly deserves trial, for if by its aid dustless roads can be constructed at the price of ordinary macadam the greatest obstacle to the reform of country road surfaces will be removed.

Landlord and Tenant.

WE recently (August 24) commented upon the case of Jenkins *v.* Price—a case in which the effect of the Conveyancing Act, 1892, sect. 3, was considered where by the terms of a lease premises were not to be assigned without the consent of the landlord, which consent was not unreasonably to be withheld, and where it was held that imposing additional rent as a condition was a fine within the meaning of the section, and therefore caused the consent to be unreasonably withheld. The question has again come before the Courts in the case of Andrew *v.* Bridgman (current "Law Reports"), but in this case there was an absolute covenant not to assign without the consent of the landlord, and the consent was given upon the terms that 45*l.* should be paid to the landlord. The plaintiff claimed to have the money returned, but the Court held—though with some doubt—that the Conveyancing Act which provides that in the absence of express terms in the lease itself the consent shall not be made subject to a sum of money in the nature of a fine does not make a bargain between the parties illegal, and that the money could not be recovered, such a bargain for good consideration having now been made. This holding, however, would appear to deprive the tenant of the protection intended by the Conveyancing Act, as the landlord by declining to consent—where the convenant is absolute—may drive the tenant into making a bargain, and it is noticeable that the decision in Jenkins *v.* Price seems not to have been brought to the notice of the Court.

Cement in Sea-Water.

A PAPER by M. le Chatelier in the *Annales des Ponts et Chaussées* sets forth the conclusions deduced by the author from a consideration of the behaviour of hydraulic cements in sea-water. In the first part of the memoir he discusses chemical phenomena, in the second the chemical action due to chemical reactions, in the third the penetration of salts into cement mortars, and finally he states the results of experiments made by him during the past seven years. These results afford valuable data relative to the unequal resistance of different cements to the action of saline solutions, calcium sulphate, magnesium sulphate, and sea-water. M. le Chatelier expresses the opinion that hydraulic cements, without exception, are decomposable by sea-water, but by no means in equal measure. Decomposition is said to be always slow in cements where the proportion of alumina is low and where the quality of hydraulicity is high. The addition of pozzuolana and kindred substances is shown to communicate to all hydraulic cements an increased resistance to chemical action, thus confirming the previous experience of Dr. Michaelis and others. Finally, the author states that the compactness resulting from the diminution of the proportion of water used in gauging, or from increase of the active elements, seems to be the most essential factor in the preservation of mortar used in the sea. As a matter of fact, the same view is now generally entertained by all having occasion to make use of cement and concrete in marine engineering.

Water Waste Detection.

A DEVELOPMENT of the Deacon system by the use of the instrument known as the pitometer is largely employed in the United States for the study of waste in waterworks distribution systems, and a form of this appliance, termed as the photo-pitometer, is described in a paper read by Mr. Edward S. Cole before the Boston Society of Arts. The instrument is based on the principle demonstrated in 1732 by the French engineer Pitot, and is primarily a rate meter, indicating the changing volocity of water within the pipe to which it is attached, thus enabling the observer to study the effects due to the closing of valves and service cocks connected with the mains. In addition to giving photographic diagrams of flow, the instrument provides a record of variations in static pressure, whereby it may be ascertained whether the observed change in rate is due to a variation of pressure at the pumping-station or to the withdrawal of water in the district under investigation. The author states that the accuracy of the pitometer has been established by many weir tests, and that since its first introduction at Terre Haute, Indiana, it has been adopted on important tests in various large American cities. His paper is one of considerable interest, and a good case is made out for the type of instrument and the method of waste detection described therein.

Letchworth Garden City.

THE agent for "First Garden City, Limited," thinks we were unreasonable in the remark, in our article of August 17, that "the development of Garden City does not seem to proceed very fast." He says:—"If the erection of 850 houses by various investors, six substantial factories in active operation, gasworks, electric power station, seven miles of roads, ten miles of sewers, waterworks and fifteen miles of mains, forty shops, three hotels, four public buildings and places of worship, and a thriving population of nearly 5,000 since September, 1904, when the estate was a range of ploughed fields, is not rapid development, we can only apologise and ask to be shown anything more rapid under similar circumstances. The steady demand for sites for all purposes, and the fact that half a million pounds sterling has been invested here by all sections of the public, should remove any fear you may have as to the future of the estate." We are very glad to give publicity to this statement, and possibly our conclusion was too hasty. The writer's objections to other remarks in the article merely amount to saying that he does not agree with us; which we cannot help.

Beddington, Surrey.

THE parish church of St. Mary the Virgin, Beddington, which stands on the verge of the Park, the seat in the XIVth—XVIth centuries of the Carews, was built *temp.* Richard II. It has nave, aisles, chancel, south porch, and west tower, with a peal of bells, and was restored with a somewhat heavy hand in 1852, and in 1868-9 by Mr. J. Clarke, who designed the park-lodges. It contains some stalls from Merton Abbey; amongst the numerous brasses and monuments are Sir Francis Carew's cenotaph (1611) and a fine brass, 1432, to Nicholas Carew and his wife. Sir Nicholas Carew, K.G., of Beddington Hall, beheaded on March 3, 1538, was buried in the Darcy family vault, St. Botolph by Aldgate; his name and those of his wife and daughter are mentioned in the inscription on the Darcy monument there. Sir Francis Carew—whose niece, a daughter of Sir Nicholas Throckmorton, married Sir Walter Raleigh—bought the estate back from Lord Darcy on whom it had been bestowed by Edward VI., and there entertained Elizabeth in 1599 and 1600, and James I. in 1603. Having passed to the Throckmortons (who assumed the name of Carew) after Sir Francis's death in 1611 the manor-house was partly re-built in 1709. Walpole, writing to Lady Ossory in July, 1779, describes his visit there and speaks of "the brave old hall with a pendent roof, copied by Wolsey at Hampton Court." The hall (having a richly wrought and curious old lock on the great door) twice escaped from fires in the two wings, and was preserved when, about forty-five years ago, the Female Orphan Asylum was established there, and the house and twenty acres of the grounds were brought from the Carew trustees for 14,500*l.* Hard frosts in 1739-40 killed the orange-trees which had been reared from seeds given to Sir Francis, an enthusiastic horticulturist, by Raleigh, who, until 1599, had a house at Mitcham. In the Park, famed for its walnut-trees and watered by the Wandle and many springs, have been found a bronze foundry and other Roman remains. The hall-lock and the Carew chapel with the oak screen and monument of Sir Richard Carew (1520) are illustrated by Pugin; and the panelling and screen (since removed) and roof of the hall by Nash.

The Mercers' Estate and Barnard's Inn, Holborn.

THE Company of Mercers will shortly let by auction, upon a building lease for a term of eighty years, the site of Nos. 20 (at present a tavern), 22, and 23 on the

south side of Holborn, together with a portion of No. 8, Barnard's Inn-chambers, and other buildings in the rear. The property has a frontage to the main street of about 63 ft., and extends over some 3,600 ft. superficial. A new passage-way is to be made to the Company's school, and it is stipulated that all the premises on the land to be let must be pulled down, and new buildings erected on the site, before March 25, 1909. The licenses of the "Barnard's Inn" public-house are not to be renewed. The Mercers' Company bought Barnard's Inn in 1892; two years afterwards their school migrated from College Hill into the new buildings erected by Messrs. E. Lawrence & Sons, after plans and designs (embodying the old hall) by the late T. Chatfeild Clarke and his son, Mr. Howard C. Clarke. Barnard's, originally Mackworth, Inn, was demised by John Mackworth, Dean of Lincoln (*ob.* 1451), to the Dean and Chapter of Lincoln (*vide* Inq. 32 Hen. VI. 1454) and bears the coat-arms of Mackworth, of Mackworth, co. Derby. The Harl MS. 1104, recounts its conversion into an Inn of Chancery (appertaining to Gray's Inn) when leased to Lionel Bernard. The Inn—the mid-XVth century hall excepted—was rebuilt in 1510; a drawing of the interior of the hall was published in our number of June 9, 1888. Over the present gateway in Holborn are the date and initial letters, "1758," and "P. R. W."

The Photographic Salon.

THE Fifteenth Exhibition of the Photographic Salon, now open at the Gallery of the Society of Painters in Watercolours, contains some very good examples of what may be done in landscape composition by the judicious selection of the point of view and the conditions of light. The large photograph of "The White Mill," by Mr. Horsley Hinton, is perhaps the best example of this, and is a photograph which realises a fine and broad pictorial effect without the device of photographing (apparently) out of focus in order to produce what is supposed to be the effect of a washed drawing. In Mr. Arthur Marshall's "Under the Chesnuts" this is carried so far that the picture is a mere blur, with scarcely anything intelligible left. Mr. Ward Muir gets some good effects (see Nos. 4 and 8); so does Mr. Charles Job in "On the Banks of the Arun" (9), and Mr. Rawlins in his snow landscape (16). "Evening Silhouette" (52), the stern of a ship and a figure, by Mr. Arbuthnot, has the making of a picture in it; Mr. W. Cadby has a charming photograph of a little boy—"Child Study" (51); and Mr. Cliffe's "Perpendicular Work, Canterbury" (137) is a small architectural photograph which exactly hits the true mean (for architectural subjects) in being clearly defined without hardness. As to some attempts at groups which are to convey an artistic meaning or a sentiment, they only serve to show once more how much subjects of this kind in painting are indebted to the artist for their expression, and how almost impossible it is to do the same thing with photography, which gives us only the prose of the situation without the sentiment.

CAMBRIAN ARCHÆOLOGICAL ASSOCIATION.—II.*

THE fine weather that had hitherto accompanied the visitors changed upon Thursday, the 29th ult. Rain had fallen during the preceding night, but when the party started upon their longest carriage excursion the clouds gave slight promise of dispersal. A few miles from their starting point a halt was called at Llanddyfnan church. The building is late Perpendicular, and internally has no feature calling for notice. The south door has a square label, its outer moulding on either side being broken for two small niches, each containing the diminutive figure of a lady holding in one hand a book. In the centre and immediately over the doorway is a representation of the Trinity, the crucified figure of the Son being between the knees of the Father; the dove, emblem of the Holy Spirit, is not clearly discernible, but a careful examination would probably lead to the discovery of faint traces of sculpture above the head of the Father. The side figures are about 30 in. in length, and the flat margin bears a dated inscription in each case. As everyone appeared to have forgotten some essential portions of a rubbing equipment, it was not possible to satisfactorily solve the problem of the exact date of the sculpture, which is doubtless also the date of the Perpendicular restoration. But the costume of the female figures, the character of the art, and the architectural details (such as the crocketed canopies crowning the effigies) point to the early years of the XVIth century. Indeed, the similarity both in treatment and in execution to the more elaborate south doorway of Holyhead church mark the work of the same craftsman. Directly the party had started to continue their journey the rain commenced to fall steadily, and gradually increased in force until it attained Noachian volume. The destination was the fine fortified position of Din Silwy, and long before the unfortunate antiquaries had reached the spot they were wet through. The place is one of the most remote and inaccessible in the island, with only a single small farmhouse near. Lunch, which it had been intended to have partaken of *al fresco*, was mournfully consumed in one of the farm outhouses. A few brave spirits faced the elements and ascended the hill upon which the camp is situated, but an adequate examination of it was impossible. An immensely strong stone wall consisting of big blocks of limestone, constructed precisely after the manner of the Llugwy enclosure seen the day previously, follows the contour of the hill, which on two sides slopes precipitously to the sea. Oblong enclosures were noticed within it, marking it, in the opinion of the present writer, a Scandinavian camp of great importance, commanding the admirable landing-place of Red Wharf Bay. The storm was at its height when the party started homewards, the remainder of the day's programme having perforce to be abandoned. With the usual contrariness of mundane things, the rain ceased just as the carriages reached Llangefni again.

Friday made amends for the shortcomings of its predecessor by breaking out in brilliant sunshine. The first visit was to the little church of Llanbabo, said to be one of the two remaining unrestored churches in the county. Efforts are being made to raise a fund for restoring this church, and some restorative work is desirable, but discretion and reverence should restrict the energies of the incumbent and the purposes of the architect to the mere rendering of the edifice wind and weather tight. Over the present south door is a curved line of zig-zag mouldings, with a rudely-sculptured head at each end and another in the centre, much as though a Norman doorway had been altered at a later period to the present square-headed entrance. Tradition has it that the heads are intended to represent St. Pabo (to whom the church is dedicated), his son and daughter. But this theory was upset by the discovery of a fourth carved head on the external side of the churchyard wall. Sir Henry Howorth observed upon the general likeness of the work to the ornamentation seen upon the wooden churches of Scandinavia, and was more inclined to regard the early church as Danish rather than Norman. It was known that Canute, who was religiously inclined, built a number of churches, and it would be no matter of surprise to find a church along that coast of pre-Norman date, though showing evidences of the Norman style of building. Internally there is nothing of interest beyond the slab commemorative of Pabo, who is designated "Post Prydain," though what is signified thereby is uncertain. The slab is of the late XIVth century. Llanfechell church was next seen. Though of greater pretensions than most of the churches of Anglesey, it has little call for notice, except that the font, which is far earlier than the building itself, should by no means be missed. Externally it is an oblong, with a circular-headed arcading carried round its four sides, three arches upon the longer and two upon the shorter sides. After luncheon Llaneilian church was visited. This parish is situated in the north-eastern corner of the island, the church itself being placed almost within the angle and within a short distance of the sea. The patron saint, St. Elian or Eilian, is the Welsh St. Hilary. The church consists of nave and chancel, both of late Perpendicular date, and a western tower so hidden by ivy that it was impossible to make out its details. Some of the party who penetrated to the roof returned with an account of Norman balusters. There is nothing improbable in the ascription, for there was here from earliest Christian times an ecclesiastical foundation that in the Middle Ages obtained high local reputation for sanctity. The shrine of St. Elian was much resorted to, and the establishment seems to have attained to a collegiate character. The church was richly endowed with lands by the original grant, it was supposed, of a British prince of the VIIth century; and a charter, purporting to have been issued at that period, was inspected and confirmed by King Edward IV., and was duly enrolled upon the Patent Rolls for that reign. Whether this Royal recognition of the rights and privileges of the church operated to increase the revenues from pilgrims or to fire the capitular body (if such there was) with the ambition of possessing a finer church it is impossible to say, but, at any rate, about the close of the XVth or commencement of the XVIth century a totally new church was erected, the older edifice containing the shrine of St. Elian, being connected with the new church by a rough lean-to passage leading out of the south side of the nave. Another means of communication was also contrived from the chancel by a flight of stone steps which led into the chapel. Architecturally this chapel is very little earlier than the main edifice, but it clearly did not form part of the plan for the reconstructed church, and was adapted to it in the best manner possible. At the eastern end is a rude wooden altar with panelled front of Perpendicular date. The church, too, contains a rood screen of rather coarse execution, and the seats both of the nave and choir are worthy of attention. The church should be considered and compared with those of Clynnog, in Carnarvonshire, and Holyhead, with both of which, though far inferior in dignity to either, it has strong affinities. At Clynnog, as at Llaneilian, is a small building known to have been the repository of the shrine of St. Beuno. But its communication with the principal church is not managed so well as in the Anglesey instance, the connecting passage having its opening out of the western tower. At Holyhead also there is the principal church, a Perpendicular edifice with very similar detail to those of Llaneilian and Clynnog, and a subordinate chapel, but here the exigencies of the site did not permit the union of the two structures. There can be little doubt that similar circumstances in each place led to the adoption of similar methods, and their execution was probably entrusted to the same hands, the variations in dignity and richness being due rather to wealth than to design.

The final meeting of the Association was held at Llangefni in the evening. Monmouth was chosen for the place of next year's gathering. The Rev. Canon Rupert Morris, D.D., was appointed editor of "Archæologia Cambrensis" in place of the late Mr. J. Romilly Allen.

* Continued from page 266 *ante*.

SHEFFIELD UNIVERSITY.—It is officially announced that a Department of Architecture will be opened in connexion with the University of Sheffield in October next

Builders' and Contractors' Column.

NOTES ON ESTIMATING.—II.*

By A. C. Passmore.

APPROXIMATE methods of estimating for buildings are:—(1) Estimating by the cost per cubic foot of similar buildings; (2) taking out rough quantities and pricing the items; (3) estimating at per square of 100 ft. super.; (4) pricing at per unit of accommodation. The more exact method of pricing from precise and accurate quantities is adopted when it is intended to actually carry out the work; it is the best and cheapest method in the end. Of the above methods the method of cubing the building is the one generally adopted for approximate estimates, but the price per foot cube requires a large experience in adjusting it to a nicety, as many factors exist which tend to alter the ratio per cubic foot of every building. The quality and quantity of materials and workmanship vary with every job, and the proportion of voids to the solid structure also affects the price, and so does the area of a building; the smaller the area the greater will be the cost of the building in comparison with the cubic contents, and a building of two or more floors or stories is cheaper to build than one of only one story. It is, therefore, obvious that work done in small quantities is worth 20 to 25 per cent. more than that done in large quantities. The means and methods of execution also greatly influence the cost, and where one builder would make a profit another will be at a loss.

Another method of building is by means of a "schedule of prices"; it is similar to a bill of quantities, only a definite price is affixed to each item before they are issued to the builder, who submits a tender stating the rate of percentage over or under the scheduled prices at which he is prepared to execute the work. This system is largely adopted in France and also in this country for Government work, but unless the approximate quantity of work required to be done is known, it is difficult to determine the rate of percentage, as quantity invariably governs price, but as a basis of contract the method is perhaps advantageous. Even in estimating from a schedule of prices, there is a certain amount of speculation.

Dispatch in executing work is the secret of success, and it may be taken as a maxim that a quick job is a cheap job; that is, a profitable job. And the person largely responsible for this is the foreman of the job or the chief supervisor actually and practically superintending the work; upon his shoulders rests the responsibility of good or bad workmanship, or the diligence or slothfulness of the men, and the financial success of the job. Poor foremen make poor men, and no man can make a good foreman or supervisor who does not understand human nature.

When executing day work it is necessary to add 15 to 20 per cent. to net wages of the men in order to provide for the contractor's trade profit, use of plant, general establishment charges, superintendence, etc. While it is essential for every builder to keep his office expenses as low as possible, he must not be penny wise and pound foolish. The office staff can only be looked upon as non-producers, a means to an end, and no profit can be obtained from their labour.

The working hours generally recognised in the building trades vary according to the town or district and the season of the year. In country districts the builder is not harassed by hard-and-fast working hours or trade unions, and is seldom compelled to pay extra rates for overtime, the workman being only too glad to work. In towns all this is altered; hard-and-fast rules exist, and extra rates have to be paid for overtime, and it is a case of each man to his trade. When workmen are sent a distance from the yard or workshop travelling expenses have to be paid, and frequently lodging-money. Workmen in towns require many more labourers to wait upon them than those in the country. At some work a handy labourer is as good, and sometimes better, than a workman, and in the country is often put to do jobs that in towns are performed by skilled workmen. In towns the "dignity of labour" is a fetish, and whilst every skilled workman is admittedly entitled to some consideration, the "dignity of labour" is at times apt to become arbitrary.

The question of rates of wages is always an important one apart from estimating, and to avoid misunderstanding it is advisable to let the men know on their engagement what rates of wages they are to be paid, especially if they are working beyond the usual working hours, or in night gangs. Where night gangs are regularly employed as night gangs solely, no extra rate is paid, but when an occasional night shift is worked it is usual to pay a slightly higher rate, but a considerable divergence of practice exists in the matter of paying for night work. When workmen are required to work more than the regulation or fixed number of hours, extra pay is usually demanded. The recognised rate according to the trade union rules is usually time and a quarter from the ordinary time of ceasing work to 8 p.m.; that is, each hour of overtime is paid for at the rate of an hour and a quarter of ordinary time, but it is generally stipulated that the full number of ordinary working hours must be worked before any overtime can be claimed; that is to say, that if a man lost a "quarter" in the morning, and worked a "quarter" at night, he could not claim overtime money, as he would only have worked the total number of ordinary hours per day. On Saturdays the pay for overtime is time and a half from noon (or from the ordinary time of ceasing work, which differs in some localities) to 4 p.m.; after 4 p.m., and also on Sundays, Christmas Day, and Good Friday, double time.

The question of travelling expenses is often a source of dispute, especially with shop-fittings firms, or those engaged in ecclesiastical work. When men are sent from the shop or yard, an allowance of 6d. per day is usually made (exclusive of travelling expenses, time spent in travelling, and lodging-money), but firms continually sending men away to work have generally their own recognised rates of payment. For work in water, or in difficult positions, or in obnoxious places, an addition of 25 to 50 per cent. over and above the ordinary rate of wages is frequently allowed the men. The conditions or rates of some of the large contractors engaged on the construction of docks, etc., are, for what is known as tide work in water or mud, time and a third; work interrupted by tides, traffic, etc., time and a half, and double time for work in water and interrupted by tides, traffic, or other causes. Water-boots and diving-apparatus are found by the contractor, but the men are generally supposed to find their own oilskins. The sinking of coal-pit shafts is generally done by the men working in "shifts," a "shift" of eight hours being paid 6s., and a "shift" of six hours at 4s. 9d., the men finding their own oilskins and "sou'-westers." The sinking of coal-pit shafts is generally done by contractors doing little else, and is often a dangerous undertaking involving loss of life.

The inefficient workman is the downfall of the estimator, especially now that work is cut down to such speculative prices. What is a fair day's wage can be defined as "a man should be paid what he earns," but this would be departing from the minimum wage system that at present exists, and would afford unscrupulous contractors the opportunity of beating down the workmen to get their labour at a cheap rate or below the minimum fixed rate of wage. The best and most practical solution of the difficulty is to pay efficient workmen at a higher rate in proportion to their abilities than the minimum wage, and to put inefficient workmen at work which affords them an opportunity of earning the minimum wage, or promptly discharge them. The art—and it is an art—of the successful management of men is possessed by very few; it requires a remarkable amount of foresight combined with ability, capacity, nerve, and strength of will to take charge of works and the management of men. Extremes should be avoided in any case; avoid bullying or constant nagging. If a workman does not appreciate being treated properly, or is inclined to take undue advantage of any kindness shown him—some men mistake kindness for weakness—and to neglect his duties, he should be promptly discharged. Such a man will corrupt his fellows and disorganise any preconceived arrangement of the builder or his representative. A person in charge of works and men should brook no interference by others with them; that is to say, a builder should not go on a job and interfere with the work and men; if there is anything wrong, or if in the opinion of the builder different methods should be adopted, he should go to his manager or foreman and have it adjusted through him. Too many "bosses" never did and never will do any good on a job. Individual ability on the part of a business man is not always conducive to success. The real insight for genius in business is the selection of a staff of men, and to mark the good ones pay them well and keep them. Have the sense to understand that one man does not always know what is best.

Modern conditions of building necessitate a builder having a larger amount of capital at his command than formerly, and the tendency is for builders to become less practical and more theoretical. The heads of many large building concerns are merely "office" men and financiers, the practical part of the business being delegated to managers and foremen for the execution of the work. The old-fashioned builder—the man who graduated from a bricklayer, stonemason, or carpenter, is rapidly becoming extinct; the master builder of the future will not be a craftsman and will not require to be, as no matter how technically brilliant and manually trained he may be, modern conditions demand that competition shall be primarily one of price, and not of technical or manual skill; and the more reckless the competitor the more chance has he of securing the work, and frequently the nearer he gets to the Bankruptcy Court. Cheapness is the present day fetish, and the builder who is master of his business and its detail, and who is competent to take personal responsibility and control of any of its departments and whose ambitions are not altogether mercenary, is gradually being beaten by the besetting sin of cheapness, and mere financial concerns whose primary object is dividends.

Commercial interests are gradually altering the conditions of the building trade; in some cases it tends more to engineering work than building work. A builder has to work at greater speed than formerly, and often has to keep the job in progress night and day.

The rebuilding of premises in restricted areas necessitate much greater care in demolition, and is more expensive to rebuild, as the builder has often no space in which to store his material, and the existing regulations regarding the carriage of materials during certain hours, so as not to interfere with business in the City of London, and also with the object of avoiding nuisance from dust, give much more trouble and make the work more expensive. Another factor that affects the cost of rebuilding work is when the business has to be carried on at the same time; in the rebuilding or alteration of public-houses this is a serious matter, especially if the builder cannot rely on his men. Another factor that largely affects the cost of building is the locality. Employers complain that they cannot get as much or as good work out of the countryman as out of the townsman. These and other obvious disadvantages in executing work in country districts more than outweigh the advantages of cheaper labour. Drink is perhaps responsible for more trouble with workmen than anything else. Too often workmen misunderstand any attempt at kind or considerate treatment, assuming it to be weakness on the part of the employer, and take advantage of it. The problem of how to stimulate men in their efforts to get work done quickly and well has yet to be solved.

An estimator should also be a quantity surveyor, or *vice versâ*, because it is imperative that an estimator should know exactly how each item has been arrived at, and a quantity surveyor should view his work from an estimator's point of view. It is also desirable that architects and builders and their foremen should possess a broad knowledge of the subject, such information being of the greatest service to all parties during the execution of the works and settling-up

* Continued from page 270.

at completion. In cases where time or circumstances will not permit the taking off the quantities in the ordinary detailed manner, the approximate cost is obtained by grouping the various materials and workmanship into a few leading items, taking off their quantities and pricing them at rates approximating to their importance. The cost may also be approximately arrived at by cubing the building.

The status of an estimator is no sinecure. If he estimates a job too low his attention is called to it in very forcible terms by his employer, and if the estimator has charge of the work he finds that the foremen also have a very unpleasant way of referring to a "cut" job; on the other hand, if he loses a job by being a few pounds too high he is blamed for not being careful enough in his "cutting" process.

To the intelligent observer it is perfectly obvious that the art of estimating is rapidly degenerating into a mere gamble; work at any price and under any conditions seem to be the present tendency. The present condition of things demands that the estimator must be something more than a clerk or a calculating automaton. He should approximate more to the position of manager, and should be chosen for his general knowledge and practical ability. It is a comparatively easy matter to execute work with first-class workmen, and plenty of them; but to execute good work with the average workman and with due economy is quite another matter. It is often proved very conclusively that the glut in the labour market is unfortunately only a glut of unskilled or indifferently skilled labour. To the thoughtful person engaged in any kind of construction work it is apparent that the present system is simply suicidal. Such a state of things might be taken philosophically and left to the consolation which lies in the theory of the survival of the fittest; but it generally happens that the fittest are crushed out of a profession which more than any other needs education, brains, and business capacity to make it successful.

The keynote of the present day is concentrated executive energy, the intensifying of inventive genius for the applica- of labour-saving methods and appliances, so as to enable work to be done more rapidly. Commerce is able to work veritable miracles, but kissing the commercial blarney-stone will not make a "cut" job "pay" without intelligent management, and the term management must not be construed to mean only buying materials at the lowest price or in the cheapest market; it is that incubus the labour element, and the hampering caused by inefficient workmen, which it is impossible to estimate. The majority of estimates are prepared from standard prices without regard to the peculiarities that exist in every job; many of these prices are obsolete and have never been properly checked to see if the work can be done at the price, or whether the price can be used as a standard one.

Building construction is so wide a subject that the present tendency is to specialise, and the builder is only left to execute the carcase. The specialists are appointed by the architects to carry out their work, and they frequently come on the building and treat the builder as an interloper, and expect him to fetch and carry in every way possible; under the present conditions the builder has practically no control over these specialists, who are really sub-contractors and should be treated as such in every sense, as it is the builder who is responsible for the contract; in fact, he acts as the general financier, and is no longer a master of trades, but merely a means to an end.

BUILDING COLLAPSES IN AMERICA.

Three recent failures of buildings during construction in the United States are useful as object lessons on the fact that, however carefully building regulations are drawn, their object can easily be defeated by careless workmen and lax supervision. The first occurrence to which we now refer was the collapse of a concrete-steel warehouse in Philadelphia where, notwithstanding the stipulation of the city building rules that the struts beneath the beam moulds should be allowed to remain in place for two weeks after deposition of the concrete, the builders' sub-foreman ordered the removal of every alternate strut five and a half days after the concreting had been finished, and then went away to look after another building contract. This order was transmitted by the workman first instructed to another man, who misunderstood it to mean that he was to take away all the struts. Accordingly, the struts were removed, and, as the concrete was still green, the building collapsed. The second failure took place during the erection of a steel-frame building in San Francisco, and was apparently due to the removal of bracing before a sufficient number of rivets had been driven. The third collapse happened while a four-story brick building was in course of demolition, and was caused by the excessive weight of old bricks which had been removed from the third and fourth stories and stacked on the second floor. Both of these mishaps were clearly due to lamentably inefficient supervision, and they show that concrete-steel construction is by no means the only kind of work which suffers from the effects of carelessness and negligence.

AN AMERICAN REPORT ON CEMENT CONSTRUCTION.

The report presented by a committee of the United States Board of Underwriters contains references to various aspects of cement construction from the standpoint of fire prevention, and suggests a model building code for the consideration of municipal authorities throughout the country. One of the most judicious recommendations in the proposed code is that the design of concrete buildings should be undertaken only by engineers of special training and experience in such work. The recommendation well deserves attention at the present time, when there is an impression abroad to the effect that the design and construction of concrete and reinforced concrete structures are very simple matters. The design of concrete-steel beams and columns really demands more technical knowledge and experience than the design of analogous steel members, for which far more complete data are available. Further, the report calls attention to various instances of carelessness and lack of proper supervision which have resulted in serious failures during the past year. The committee say that these cases prove very clearly that no reliance can be placed on the advertisements of some patentees in America who claim that their systems obviate the necessity for skilled labour and the most rigorous superintendence. The truth is that no class of work requires greater skill and care than concrete and concrete-steel construction, a view which we are glad to say is more generally accepted in Great Britain than in the United States, and some other countries.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

AT the meeting of the Building Act Committee, held on July 29, the committee dealt with the following Applications. The names of the applicants are given between parentheses:—

Lines of Frontage and Projections.

Clapham.—Mission hall building adjoining No. 113, New-road, Clapham, and abutting upon Corunna-road (Mr. W. Dewes for Rev. G. B. Riddell).—Consent.

Dulwich.—Blocks of flats upon a site on the southern side of East Dulwich-road, Dulwich (Messrs. Rutherford & Grierson for Mr. J. Barr).—Consent.

Hammersmith.—Retention of entrance steps and landing in front of the Shepherd's Bush Tabernacle, Shepherd's Bush-road, Hammersmith (Mr. P. W. Hawkins for the trustees of the Tabernacle).—Consent.

Hammersmith.—Extension of the periods within which the erection of buildings on the site of "Old Oak Villa," Uxbridge-road, Hammersmith, was required to be commenced and completed (Mr. W. G. Ingram).—Consent.

Islington, East.—Theatre building upon a site abutting upon Prah-road and St. Thomas-road, Islington (Messrs. F. Matcham & Co.).—Consent.

Kensington, South.—Erection of an enclosed porch and covered way in front of "The Limes," Holland-park-gardens, Kensington (Messrs. Hubbard & Reinmann for Mr. B. Oumiroff).—Consent.

Lewisham.—One-story shops in front of Nos. 130 and 132, Rushey-green, Catford, Lewisham (Mr. W. Wilkinson for Mr. T. Lane).—Consent.

Lewisham.—Erection of a one-story addition to St. Mary's Oratory, No. 32, Sydenham-hill, Lewisham (Messrs. Johnson, Saul, & Co. for Very Rev. Father Sebastian Bowden).—Consent.

Lewisham.—An addition to the Blackheath High School for Girls, Wemyss-road, Blackheath (Mr. J. O. Smith for Girls' Public Day School Trust, Ltd.).—Consent.

Marylebone, East.—Erection of an oriel window on the western side of a building to be known as St. James's Hall, Great Portland-street, St. Marylebone, to abut upon Hallam-street (Messrs. Joseph & Smithem for Messrs. Perry Brothers).—Consent.

Marylebone, East.—A motor garage at the rear of No. 28, St. John's Wood-road, St. Marylebone, abutting upon Lodge-place (Mr. H. Chatfeild Clarke for Mr. W. Murray).—Consent.

Marylebone, West.—Two six-story bay windows on the St. John's Wood-road frontage and three six-story bay windows on the Maida-vale frontage of Northwick House, Maida-vale, St. Marylebone (Mr. E. C. Pilkington for Mr. H. Harris).—Consent.

Marylebone, West.—An oriel window in front of a building on the eastern side of Lisson-street, St. Marylebone, northward of Mitcham-street (Mr. W. Lockwood for Colonel Sandys).—Consent.

Norwood.—Buildings on the western side of Brixton-hill, Brixton, between the Lambeth Town Hall and Hayter-road (Messrs. Gush, Phillips, Walters, & Williams for Mr. R. A. and Miss C. S. T. Johnston).—Consent.

Peckham.—One-story shops in front of Nos. 1, 1A, 3, and 5, Choumert-road, Peckham (Mr. W. L. Dowton for Messrs. Cartwright Brothers).—Consent.

St. George, Hanover-square.—An iron and glass shelter in front of the Wilton Hotel, No. 32, Wilton-road, St. George, Hanover-square (Messrs. J. A. J. Woodward & Sons for Mr. R. L. Tuffin).—Consent.

St. George, Hanover-square.—A projecting metal and glass sign in front of No. 2, Albemarle-street, Piccadilly (Messrs. J. I. Thornycroft & Co. Ltd.).—Consent.

Strand.—The retention of three wood and glass show-cases in front of No. 1, Piccadilly-circus, St. James, Westminster (Mr. A. Oldcorn).—Consent.

Wandsworth.—A Baptist church on the western side of Bickersteth-road, Lower Tooting, abutting also upon the northern side of Longley-road (Messrs. J. Wills & Sons for the trustees).—Consent.

Width of Way.

Hampstead.—A one-story building on the southern side of Coleridge-gardens, Fairhazel-gardens, Hampstead, at less than the prescribed distance from the centre of Coleridge-gardens (Mr. C. Hall).—Consent.

Hampstead.—An addition to an existing greenhouse on the south-eastern side of Shepherd's walk, Hampstead, at less than the prescribed distance from the centre of the street (Messrs. Potter for Mr. H. E. Emery).—Consent.

Kensington, South.—A water-closet at No. 27, Phillimore-mews, Kensington, at less than the prescribed distance from the centre of the mews (Messrs. J. Barker & Co. for Mrs. Medcraft).—Consent.

Width of Way and Lines of Frontage.

Kennington.—A porch and offices at Archbishop Sumner's Schools, Reedworth-street, Kennington, at less than the prescribed distance from the centre of the roadway of the street (Mr. A. H. Ryan-Tenison for the managers of the schools).—Consent.

Lewisham.—The re-erection of Brockley-cottages with the flank abutting upon Malyon road, Lewisham (Mr. J. P. Briggs for Mr. S. Barnes).—Consent.

Peckham.—Buildings on the western side of Elm-grove, Peckham, abutting also upon the eastern side of Victoria-road (Mr. R. Saunders for Mr. R. Syer).—Consent.

Strand.—Two iron and glass shelters along the Panton-street and Oxendon-street frontages of the Comedy Theatre, Strand (Mr. A. Blomfield Jackson for Mr. A. Chudleigh).—Consent.

Westminster.—A building on the north-eastern side of Vauxhall Bridge-road, Westminster, abutting also upon the north-western side of Edward-street, with a projecting angle portico (Mr. E. A. Fermaud for Mr. E. Cole).—Consent.

Marylebone, West.—Erection of a larder and covered way in front of No. 7, Langford-place, St. John's Wood (Messrs. Doulton & Co., Ltd., for Mrs. E. Pigott).—Refused.

Width of Way and Deviation from Certified Plans.

St. Pancras, South.—A modification of the conditions on which consent was given on July 2, 1907, to the erections of buildings upon a site abutting upon Tottenham-court-road, Fitzroy-court, Whitfield-place, and Warren-street, St. Pancras (Messrs. Seth Smith & Monro for Mr. C. E. B. Young).—Consent.

Width of Way and Construction.

Bow and Bromley.—Retention of a building of a temporary character at Five Bells-wharf, Old Ford-road, Bow (Mr. W. G. Harris).—Consent.

Frontage and Construction.

Hammersmith.—A deviation from the plans approved on October 18, 1907, for the erection of a temporary gangway over Wood-lane, Hammersmith, so far as relates to an alteration in the

detail of the girders at the eastern end, connecting with building No. VIII., at the Franco-British Exhibition (Mr. E. White).—Consent.

Formation of Streets.

Lewisham.—That the Council do consent to the application of Mr. G. A. Lansdown, on behalf of Messrs. W. J. Scudamore & Sons for an extension of the time within which the roadways of proposed streets to lead from Manor-park to Manor-lane, Lee, were required to have been clearly defined and thrown open to the public, and do also permit the proposed streets to be defined by 14 in. by 9 in. brick piers at intervals, in lieu of posts and rails.—Consent.

Battersea.—That an order be issued to Mr. E. Evans refusing to sanction the formation or laying out of streets for carriage traffic upon the Battersea-rise House estate, Clapham Common, West side, Battersea.—Refused.

Cubical Extent.

Marylebone, West.—Deviation from the plans approved on July 2, 1907, for the erection of a building upon a site abutting upon Oxford-street, Duke-street, and Somerset-street, St. Marylebone (Mr. R. F. Atkinson).—Consent.

Strand.—The erection at the Clements Printing Works, Portugal-street, Strand, of an addition which together with the existing building will exceed in extent 250,000, but not 450,000, cubic ft. and is to be used only for the purposes of the trade of newspaper printing (Messrs. Emden, Egan, & Co. for *Financial Times*, Ltd.).—Consent.

Space at Rear.

St. George, Hanover-square.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of an addition at the rear of No. 2, Park-street, St. George, Hanover-square (Mr. W. D. Caröe for Mr. E. Lucas Ralli).—Consent.

Space at Rear and Alteration of Buildings.

Stepney.—The construction of dwelling rooms in a public hall known as Brunswick Hall, Whitechapel-road, Stepney (Messrs. G. Baines & Son for Rev. T. Jackson).—Consent.

Wandsworth.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the retention of a house on the southern side of Smeaton-road, Wandsworth, westward of No. 43, with an irregular open space at the rear (Mr. G. W. Allen for Messrs. Mulliner & Sons).—Consent.

Alteration of Buildings and Cubical Extent.

Bow and Bromley.—Removal of the wall separating the ground floors at the Old Ford Clothing Works, Old Ford-road, Bow (Messrs. Still, Wheat, & Luker for Messrs. J. Compton & Sons).—Consent.

City of London.—That the Council do no make order with regard to the use of armoured doors in lieu of iron doors to party wall openings on the basement and ground floors of Nos. 61 and 63, Moor-lane, City (Messrs. Mather & Platt, Ltd., for Dr. Jaeger's Sanitary Woollen System Company, Ltd.).—No order.

Camberwell, North.—The conversion of the Rose and Crown beerhouse, Acorn-street, Camberwell, into two dwelling houses (Messrs. Style & Winch, Ltd.).—Consent.

Finsbury, East.—Formation of a cartway and loading dock at Nos. 206–210, City-road, and Nos. 1 and 3, Bath-street, Finsbury (Messrs. Lipton, Ltd.).—Consent.

Hampstead.—A modification of the provisions of sect. 77 so far as they relate to the uniting of two factory buildings on the western side of Cressy-road, Hampstead (Mr. F. S. Hammond for Messrs. Mansell, Hunt, Catty, & Co.).—Consent.

St. George, Hanover-square.—A modification of the provisions of sect. 77 so far as they relate to the retention of openings in the party wall between Nos. 8 and 9, Dover-street, Piccadilly (Mr. F. T. Verity for Mr. H. W. May).—Consent.

Strand.—The erection of an additional story to No. 8, Albany-court-yard, Piccadilly (Mr. W. Willett).—Consent.

Cubical Extent and Construction.

Deptford.—That the Council do approve the plans submitted with the application of Messrs. Stock, Page, & Stock, on behalf of Messrs. J. Stone & Co., Ltd., for the construction of a building to exceed 250,000 cubic ft. in extent on the western side of Arklow-road, Deptford, to be used for the manufacture of machinery for steam vessels.—Consent.

Buildings for the Supply of Electricity.

St. Pancras, East.—That the Council do approve the amended plans for the construction of an engine-room at the generating station, King's-road and Pratt-street, Camden Town (Mr. S. Baynes for the St. Pancras Metropolitan Borough Council).—Consent.

CLUB PREMISES, MAINDEE, MON.—A new Liberal Club is being built at Maindee, Newport. The building will cost about 1,000*l.*, and the contract has been let to Messrs. King & Co., Newport. Mr. Alfred Swash is the architect of the work.

Trade Catalogues.

THE International Siegwart Beam Company, of Lucerne, send us a pamphlet containing a description of the Siegwart beam for fire-resisting floors and roofs, a demonstration of their method of calculations, a table of safe loads, some records of tests, a list of works already executed, and plates reproduced from working drawings of complete structures. The characteristic feature of the Siegwart system of reinforced concrete is that hollow beams are manufactured in advance to any required dimensions, so that they can be employed on the building and laid in position on the walls of supporting girders. The spaces between the beams are filled in with fine concrete, and the whole series forms a monolithic floor or roof. The beams are manufactured in five standard depths ranging from 5 in. to 9 in., the width being 10 in. in each case. Reinforcement is applied in the form of round bars in the sides of the beam, some of the bars being bent upwards at the ends, and all of them are bent at the ends into loops for the purpose of supplementing the adhesion between the concrete and the metal. One advantage of the Siegwart system is that floors can be constructed without the necessity for centring and moulds, and without the delay involved by the setting of concrete which has been moulded on the site. The chief disadvantage of the system is that, except for places near the works of the patentees or of licensed manufacturers, the packing, transport, and storage of the beams necessitate considerable expense and trouble. We are informed that thirty-two factories have been established so far on the Continent and in South America, but no arrangements seem to have been made in this country. Consequently, the system is merely of academic interest to our readers at the present time.

Messrs. W. H. Willcox & Co. send us a leaflet giving particulars of the Willcox-Turner triple-action plunger pump, a compact appliance acting both as a lift and force pump, and made for hand use in various ways as well as for operation by mechanical power. The hand-power type, worked by means of a lever handle, is finished in various styles suitable for attachment to a wall or any vertical support, mounted on a portable iron stand with or without wheels, and mounted on a timber barrow for garden irrigation and contractors' purposes. When mechanical power is to be utilised the pump is mounted upon a cylindrical cast-iron standard, having an extended base, and carrying at the top fast and loose pulleys and a disc crank by which reciprocatory motion is communicated through a connecting rod to the pump lever. This type of pump appears to be of good design and workmanlike construction. It is made in three sizes, with outputs ranging from 600 gallons to 1,120 gallons per hour.

Messrs. Sutcliffe, Speakman, & Co., of Leigh, Lancashire, send us a list describing the new lime clinker brick-making plant recently installed at the Nelson Refuse Destructor Works under the supervision of Mr. J. A. Priestley, the superintendent of the Health Department. The process described has been introduced for the purpose of utilising the clinker, and, to some extent, the heat generated in the cells of the destructor. The new plant includes grinding mills for reducing the clinker and lime to a suitable degree of fineness, a patent mixing machine where ground clinker, lime, and a certain proportion are thoroughly incorporated and boiled, storage hoppers for maturing the mixture, and brick press of the "Emperor" type, whence the bricks are conveyed on trucks to the hardening chamber. This portion of the plant is a steel cylinder of 6 ft. diameter, and with the capacity of 7,000 bricks. The chamber is provided with a hinged door held in place by steel bolts when closed, so that the bricks can be subjected to the action of steam at the pressure of 125 lb. per square inch. The finished bricks are said to be of a blue or slate colour, and tests for compressive strength and absorption made by Messrs. Kirkaldy appear to have given excellent results. Of course, Nelson is not the only municipality where efforts are devoted to the utilisation of clinker, but all the same the ratepayers ought to congratulate themselves upon the prospect of savings as the result of the new installation.

Mr. James Shaw sends us a circular of his patent smoke preventer and fuel economiser, which consists of perforated cubes formed of fireclay and asbestos built up on the bridge of a Cornish boiler, or bridges of a Lancashire boiler, leaving a clear passage of about 9 in. below the middle of the furnace tube. The idea is precisely the same as that of the Greaves patent fire bridge, which was described in our issue of January 21, 1905. In each case the material becomes incandescent under the influence of heat, and completes the combustion of unconsumed furnace gases, thereby effecting a considerable saving of fuel and reducing to a minimum the amount of smoke emitted from the chimney. Mr. Shaw's system is very simple, and the incandescent bridge can be built up or removed for cleaning purposes by any intelligent man.

"POLESDEN LACEY."—Some of our readers may have been puzzled by the statement in Mr. Poynter's description of this house in our last, that the portico reproduced the order of "the Ionic temple on the Glissons." Had the word caught the editor's eye, he would have seen that something was wrong, and might have guessed that "Ilissus" was intended, but the architect's MS. would have given him little help in that direction, and we must exonerate the printer's "reader" from any charge of carelessness.

Illustrations.

DESIGN FOR A STREET BRIDGE OVER THE THAMES.

THIS drawing, which was exhibited at the Royal Academy under the names of Messrs. Collcutt & Hamp, represents the idea for a street bridge—a bridge with houses carried along on each side of it, which was brought forward by Mr. Collcutt in the course of his Presidential address to the Institute of Architects, reported in our issue of November 10 of last year. It will perhaps be most convenient to our readers, and most fair to the author of the design, to reprint here what he then said in recommendation of the idea. After commenting on the great need of a bridge for street traffic where the Charing Cross railway bridge now is—which is quite unquestionable—Mr. Collcutt continued:—

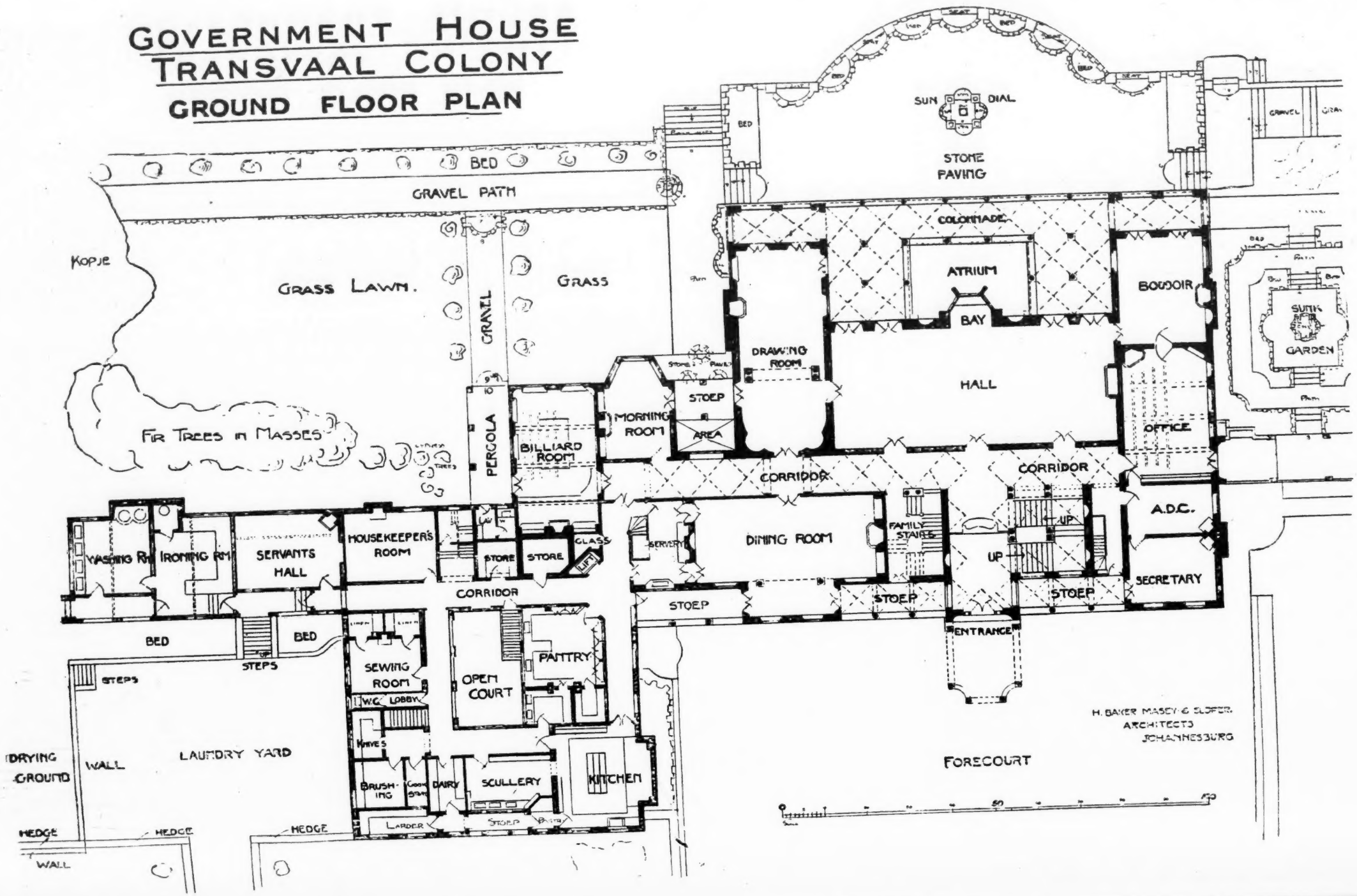
"Would it not have been worth while to consider the possibility of erecting a structure on the principle of some of the mediæval bridges? An obvious suggestion would be a bridge of the type of old London Bridge, the great national wonder of the Middle Ages, and, even as late as the XVIIIth century, the only bridge of the capital. Expense, of course, would be a serious objection; but when one considers that old London Bridge was erected by contribution in the reign of John Lackland, one wonders whether it would not be possible to achieve a similar masterpiece in the XXth century, and by the same means. In the XVIth century Lyly the Euphuist wrote from London:—'Of all the strange and beautifull showes me thinketh there is none so notable as the Bridge which crosseth the Thames which is in manner of a continuall street, well replenished with large and stately houses on both sides.'

Another point greatly in favour of London Bridge in mediæval times was the connexion it made with the suburbs south of the water. In those days Southwark formed comparatively an integral part of London. Shakespeare would hardly have built the Globe Theatre in Southwark if his patrons had had to face the discomforts of an open bridge. It is the present want of easy and convenient communication between the north and south of the river that prevents the improvement of Southwark and Lambeth. In these localities there is a large area of very inferior property; but if they were more pleasantly accessible from the City and Westminster the congested areas on the north side of the river might be relieved by extension to the south side. In fact, with a street-bridge communication Southwark might easily become a real part of the City and a more important business centre.

Other fine and still existent examples of street bridges are the Ponte Vecchio in Florence, the Rialto in Venice, and the comparatively modern bridge over the Avon at Bath. This last example is, of course, quite a small work; but it serves to connect, as by a street, two parts of Bath that would assuredly have had a different history had the bridge been merely an open one. It may also be instanced as a successful architectural treatment, especially as seen from the river.

Of course, it might be objected that a street bridge or bridges over the Thames would detract from or even destroy the architectural beauty of the Embankment; and, indeed, any scheme that might endanger the grand effect of this noble work must be approached with the greatest caution. It would never do to imperil the beauty of the only noble engineering work of the last century, nor to spoil the many picturesque views from our London bridges. But, bearing in mind the examples already referred to, I contend that the Thames might be spanned by street bridges which would not in any

GOVERNMENT HOUSE
TRANSVAAL COLONY
GROUND FLOOR PLAN



way detract from its present beauties. The existing bridges of Blackfriars and Southwark might be metamorphosed into stately erections, and a fine site for another 'national wonder' could start from the end of Northumberland-avenue."

We see no objection architecturally to the idea, and it is quite true that a street bridge seems to make a much closer and more comfortable connexion between the neighbourhoods on opposite banks of the river than an open bridge, with its exposure to rain and wind. There may be the practical objection that if the City bridges were generally treated in that way the buildings would interfere more or less with the free circulation of air along the course of the river; and in fine weather at all events most passengers would prefer the open bridge with the sight of the river and of the distant buildings: so that there is a good deal to be said on both sides. But the idea is certainly worth consideration.

GOVERNMENT HOUSE, PRETORIA.

THE new Government House for the High Commissioner, Pretoria, is built two and a half miles out of the hot and dusty valley in which the capital is built—on the top of a stony kopje. It is placed almost on the very edge of the ridge, so as to overlook the sloping side of the hill covered with native bush, and to command a very extensive view of the surrounding country.

Unfortunately, good building stones are difficult to obtain at Pretoria, and the stone of the kopje is very hard metamorphous sandstone, and it was therefore considered that under the circumstances whitewashed plaster would best suit the atmosphere and landscape of the Transvaal.

The position on the edge of the kopje, allowing only a small semicircular terrace on the garden front of the house, rendered it necessary to have the forecourt, the porch, and the vestibule at a lower level than the ground floor. This gave opportunity for the extensive cloakrooms which are required.

The chief feature in the plan of the house is the large hall for receptions, which has been made an integral part of the house, instead of being placed, as in most of the larger Colonial Government houses, in a separate suite of entertaining rooms detached from the living portions of the house. Leading from this hall is a large peristyle, open in the centre to give brightness to the large bay window of the hall, from the recesses of which a magnificent view is obtained of the garden and the distance.

Although the hill site of the kopje renders the house comparatively cool, it is yet necessary that all the windows should be protected from the direct rays of the sun. Consequently most of the windows have shutters, and where they are not protected by the covered loggias, and in the case of the large hall where the windows are too large and high for shutters, large coved eaves or hoods projecting 4 ft. or 5 ft. give shelter from the mid-day summer sun, which, as Pretoria is only 2 deg. south of the tropic of Capricorn, shines at that time almost vertically. By means of these the glass of the window is generally in shadow.

The vestibule and both corridors, upstairs and downstairs, are vaulted and groined in white plaster. Throughout the house the object of the designers has been attained of having as little variety of decorative treatment as possible. Thus, with the exception of the billiard-room and a few of the family bedrooms, where a grey-green canvas paper has been used, the walls and ceilings in every room in the house are almost universally white.

There are, however, beam ceilings in the office and in the billiard-room, and the walls of the dining-room and the High Commissioner's office are of teak with large, plain Georgian panels. The large hall also has teak panelling about 11 ft. high. The ceiling of the hall is composed of beams of a dark red Australian jarrah wood, the constructional trusses of which disappear into the white plaster vaulting of the ceiling.

In all the rooms the colour effect is obtained against the pure white by the rich colours of the curtains and the covers of the chairs and sofas.

The bulk of the furniture has been supplied by Messrs. Keightley, of Kensington, London, but a small amount of it has been made at Capetown, Johannesburg, and Pretoria out of the hard, dark timbers from the South African forests. These South African timbers, although unsuitable for ordinary building purposes, cannot be equalled for the purpose of making furniture.

The house has been built by Messrs. Edmanson & Thomas, of Johannesburg, under the direct personal supervision of Mr. Turner, the foreman, and Mr. D. F. Ellis, the clerk of works.

The architects are Messrs. H. Baker, Masey, & Sloper, of Johannesburg and Capetown.

Correspondence.

MEDIÆVAL CHURCH PLANNING IN ENGLAND.

SIR,—In the important series of articles by Mr. Francis Bond, concluded in your issue of August 31, there are several points which, though not affecting the main purpose, are of considerable interest, and on which may I venture to offer a few remarks?

In his first article Mr. Bond says that for the benefit of the illiterate thousands of the XIth and XIIth centuries the Catholic Church ordained the service of the Mass as it remains to this day. Surely that is a rather loose way of putting it, and leaves what I conceive to be Mr. Bond's real meaning open to serious misunderstanding.

Then in the fourth article, would it not be more accurate to say that the Cistercian Order was another offshoot from the Benedictine rather than an offshoot from the Cluniac? St. Robert of Molesme was a Benedictine; and is not the date of his foundation of the Order somewhat earlier, viz., 1092? It hardly seems right and proper in any account of the Order and its pioneers to omit mention of St. Stephen Harding, an Englishman from the monastery of Sherborne, who governed Citeaux for twenty-five years with so much ability and success that he may be regarded as its second founder. The peculiar system of the Cistercians was his work. It was he who received St. Bernard, and it was by his exertions that the four great daughter houses of La Ferté, Pontigny, Clairvaulx, and Morimond were founded.

In the last article, dealing with the churches of the Canons Regular and Secular and the Friars, in the case of the Augustinian or Black Canons Mr. Bond does not afford any information as to the early history of this important Order, which, though somewhat obscure, is of interest. As to their first foundation in England, was it not that of St. Botolph's, Colchester, and not Holy Trinity or Christ Church, Aldgate, and the date some few years earlier?

In the case of the Dominicans or Black Friars, it seems hardly correct to give as an alternative general title the term "Jacobins," which applied only to France from the fact that their first house there was in the Rue St. Jacques at Paris.

Neither does it seem correct to class the Minoresses as an Order other than Franciscan. They were instituted by St. Clare about 1212 as the branch of the Franciscan Order for females, and came to be known also as "Poor Clares." I felt some surprise, due doubtless to my ignorance of much recent Franciscan lore, to find that Mr. Bond describes St. Clare as a sister of St. Francis of Assisi, and I should be glad to know what authority there is for that view.

WILLIAM J. DEVLIN.

PATENTED BARS IN REINFORCED CONCRETE.

SIR,—My attention has been drawn to your issue of August 31, wherein appears a review of a lecture upon Reinforced Concrete, delivered by Lieutenant-Colonel Winn, late of the Royal Engineers. In your remarks, doubt is thrown upon the advisability of using patented bars at an increased cost (according to the lecturer of 35 per cent.) when plain bars have hitherto been used with success. I assume from your statement that if it were not for the increased cost referred to you would give preference to the patented bars, and the following comparison should therefore be of interest, clearly showing as it does that the patented bar (Kahn Bar in this case) is eventually cheaper than round rods and loose stirrups.

Comparison of Cost between Round Rods, Loose Stirrups, and Kahn Bars.

As the basis for comparison the writer obtained details of cost on two constructions, in the one of which round rods and loose stirrups were used, the total cost of the work being 100,000*l.* In the other construction, the cost of which was only 4,231*l.*, Kahn Bars were used. It will, therefore, be seen from the comparative basis taken that the advantage lies with the larger construction, *i.e.*, round rods and loose stirrups, inasmuch as work should be done on a lower unit scale in operations of magnitude. The same foreman was employed on both jobs, and through his time-sheets the cost of mixing and placing concrete in the forms was ascertained to be 10s. per yd. cube on the first job, *i.e.*, round rods. The cost of mixing and placing concrete on the second job, *i.e.*, Kahn Bars, taken also from the time-sheets, came out at 8s. per yd. cube, or in other words, a saving of 2s. per yd. cube, due entirely to the handling of the reinforcement. Taking the smaller construction of 4,231*l.*, wherein Kahn Bars were used for the example in both cases, we find that 1,097 cube yds. of concrete and 77 tons of reinforcement would be required, and the costs would therefore work out as follows:—

Cost of Construction in Round Rods and Loose Stirrups.

	£	s.	d.
77 tons of bars delivered at site at 7*l.* 10s.	577	10	0
1,097 cub. yds. of concrete, mixing and placing at 10s.	548	10	0
12½ p.c. Royalty or cost of designing on 4,231*l.*	528	17	6
Total	1,654	17	6

Cost of Construction in the Kahn System.

77 tons Kahn trussed bars delivered at site at 14*l.*	1,078	0	0
1097 cub. yds. concrete, mixing and placing at 8s.	438	16	0
Total	1,516	16	0
Saving in cost in favour of the Kahn System	137	4	6

In the figures quoted certain items only have been taken, as it will be obvious that the cost of concrete components, centring, etc., will be standard in each case. It should be noted that I have allowed a royalty or designing fee of 12s. 2d. per cent. in the round rods and loose stirrups' cost, as this is, I believe, the customary fee where an outside specialist is retained. No designing fee is charged for Kahn Bars, as the tonnage price includes all drawings, but where an architect or engineer designs his own constructions a reduction equivalent to 12s. 2d. per cent. is made in the price. I claim that the figures quoted, which may be substantiated if necessary, prove conclusively that Kahn Bars are in effect 10 per cent. cheaper than round rods and loose stirrups apart from the other advantages which the Kahn system covers. I take it that any correspondence is of advantage which throws light upon the use or cost of reinforced concrete, and to this end the writer will be glad to see any remarks which may be made upon the subject for the purpose of disproving the statements made, or to see such other information thereon as your readers may have at their disposal.

M. KAHN.

PUBLIC ELEMENTARY SCHOOLS.

SIR,—In answer to Mr. Bailey's letter in your issue of August 31, I regret to state that the report of the paper I read before the International Congress of School Hygiene, which appeared in the *Builder* for August 17, was somewhat curtailed.

In tracing the various developments of the English school, what I said was as follows:—"The prototype of the English public elementary schools is that of the ancient grammar school, which consisted of a large hall, representing the whole of the teaching accommodation, and in which were seated pupils of different ages taught by one master. Various modifications of the plan gave rise to a type of school known at that time as the pupil teacher system. . . . . The next development of the English school was in grouping several rooms (each accommodating two or more classes) round the large schoolroom, and finally the late School Board for London built a school with classrooms of not more than eighty each, and with a separate teacher for each room, the large schoolroom or hall being used for one class only."

The school in question was erected in the year 1872 in Stepney, and the architect was Mr. T. Roger Smith.

G. TOPHAM FORREST,
Architect to the Northumberland Education Committee.

Newcastle-on-Tyne,
September 5, 1907.

"POYNDERS END, HERTS."

SIR,—Owing to my absence from home and other unforseen circumstances, it proved impossible for me to send plans and letterpress about the above building in time to appear in your last week's issue; but I should like to mention by letter a few of those firms who have co-operated with me in the erection of this house. The general contractor was Mr. Walter Jeeves, of Hitchin, Herts, while Messrs. P. H. Barker & Son, Messrs. Galward & Sons, Ltd., and Mr. A. E. H. Theobalds, all of Hitchin, undertook respectively the carpentry and joinery, ironwork, and plumbing and painting. Hot-water heating, kitchen range and domestic hot water supply and firedamp grates were undertaken by Messrs. F. Edwards & Son, of Great Marlborough-street, W.; iron and bronze casements and lead glazing by Messrs. Wainwright & Waring, of Chiswick-road, Acton Green, W.; ornamental cast lead work on

square bay of hall by Mr. G. P. Bankart; the Artificers' Guild, Ltd., of Maddox-street, supplied the door latches and furniture, which were designed by Mr. Edward Spencer; the Guild of Handicraft, Chipping Campden, executed the weather vane and hall grate; and Mr. A. Robinson, Bloomsbury Carving Works, the carved and gilt oak sundial; Messrs. Grey & Co., of 115, Leadenhall-street, E.C., undertook the system of lightning conductors; and the Septic Tank Company, of Victoria-street, Westminster, supplied the details and fittings for the septic tank. Quantities were prepared by Messrs. Gandy & Bennison, of 22, Essex-street, Strand.

GEOFFRY LUCAS.

The Student's Column.

MODERN METHODS OF USING GAS.—X.

Gas Fires.

FIRES WITH BALL FUEL.—Considerable improvement has been effected within the last few years in that form of gas fire in which lumps of asbestos or other incombustible mineral are heated by non-luminous flames. Formerly they were so made that an ordinary householder had to call in a gasfitter to give the burners of the fire that periodical cleaning which all Bunsen burners require. Dust deposited by the atmosphere, and powdered mineral matter produced by attrition of the ball fuel, gradually accumulates in the Bunsen tube and prevents the proper proportion of air from being drawn into the tube and mixed with the gas before combustion. The Bunsen tube and burners of every gas fire should be cleaned at least once in every three months, and this cleaning is now easily accomplished owing to the fires being made of a number of parts which can easily be detached (Fig. 20).

Another improvement consists in the provision of an air regulator for the burner. By means of the regulator the quantity of air admitted into the Bunsen tube may be restricted until the proportion best suited for the quality of the gas supplied in any particular district is obtained. The air adjuster should be provided with a locking arrangement to prevent accidental alteration of its position. Formerly gas fires with unadjustable air-inlets were used indiscriminately with rich and poor gas, and with ungoverned gas supplied under widely different pressures.

Governors for Fires.—In districts supplied with gas under a pressure exceeding 3 in., a governor may with advantage be fitted to the supply pipe of each fire to prevent excessive gas consumption. When the gas cock is under the sole control of the person who has to pay for the gas it is not necessary to provide a governor, since it is easy to reduce the gas consumption to any desired extent by manipulating the cock. Where there is a probability that the cock will frequently be allowed, through negligence, to remain fully open throughout the day, a governor should be provided. The cock should be fully open until the ball fuel is incandescent. It may then be so adjusted that it will allow to pass only that quantity which is required to maintain the fuel in a red-hot condition.

Odours from Gas Fires.—When a lump of cold ball fuel is plunged into a small gas flame a disagreeable odour is emitted until the fuel has become hot. This is due to the flame being cooled below the temperature required for complete combustion of the gas. An offensive odour is therefore emitted for a few moments from all fires in which gas flames play around lumps of cold mineral matter. The more massive the lumps the more persistent is the odour. Hollow fuel of fireclay composition is much less objectionable than massive lumps of asbestos. When the fire is connected with a chimney with a strong up-draught the odour is not perceptible in many cases. When the disagreeable odour continues to be emitted for a long time, it will be found either that the burners are in a dirty condition, or that a lump of ball fuel has slipped down from its proper position so that it is distorting the flame and preventing perfect combustion of the gas. The fuel should never approach within an inch from the burner.

Reflector Stoves.—In these stoves the heat and light from a number of luminous jets are reflected from burnished copper, the roof of the stove being of fireclay. As the flames do not come in contact with any solid substances these stoves do not emit any offensive odour if kept reasonably clean. When properly constructed they are noiseless, whereas most fires provided with atmospheric burners emit more or less noise when in action.

Flueless Stoves.—The prejudicial effects of flueless gas stoves upon health have been greatly exaggerated, but it is nevertheless a good rule never to use a flueless gas stove where it is possible to connect the stove to a chimney with a constant up-draught. The use of a stove connected to a flue in which a down-draught exists is worse than the use of a flueless stove. The products of combustion escaping from a good flueless condensing stove are practically harmless, but since carbon dioxide is not a supporter of life, and bedrooms are often badly ventilated in cold weather, no flueless gas stove should be used in any bedroom. A flueless gas stove should be odourless, and the emission from it of an offensive odour should be accepted as a danger signal.

Radiant and Convected Heat.—It is better to heat the walls and furniture of a room by radiant heat than to heat the air and allow the heated air to slowly warm the walls and furniture. The body will part with its heat to cold walls and furniture, and, in consequence, become chilled; but it will not become chilled by inhaling cold air if the walls and furniture are warm. The popularity of the ball fuel fire is due to the large proportion of radiant heat obtained from it.

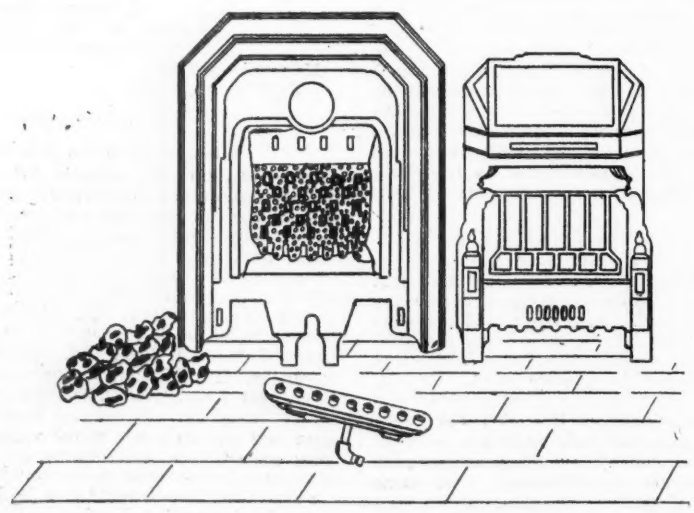


Fig. 20. A Gas Fire with Detachable Parts.

Obituary.

MR. BACHE.—The death, on September 6, at Penzance, is announced of Mr. Alfred Bache, M.I.Mech.E., and M.Inst.C.E., aged seventy-two years. Mr. Bache, a native of Birmingham, was educated in the Edgbaston School, Queen's College, Birmingham, and London University. In 1884, being then assistant secretary, he was elected out of nearly 200 candidates as secretary to the Institution of Mechanical Engineers. In 1898 he resigned the appointment through ill-health, and retired to Penzance. He was an accomplished musician and linguist—chiefly in the modern and ancient languages of Europe.

General Building News.

NEW CHURCH, BECKENHAM.—Building operations have just been commenced in connexion with a new church which is to be built in this district. An iron structure will be first raised, then a stone chancel added, and finally the permanent nave. The temporary church will be about 100 ft. in length, and is intended to accommodate about 250 people. It is being erected from the designs of Mr. George Fellowes Prynne, who is also the architect of the permanent church eventually to be built.

UNITED METHODIST CHURCH, HULL.—The erection of a new church for the United Methodists has just been completed on the Boulevard at Hull. The new building consists of nave, aisles, and transepts, with a recess for the organ and choir. The arcades of the nave are carried on cast-iron columns. The seating is semi-circular in plan, and will accommodate about 550 persons, and there is a gallery at the west end. Access to the body of the church is obtained by two entrances into a vestibule, and there is a retiring room opening from this vestibule. There is a separate entrance for the use of the gallery occupants. A vestry is provided for the minister with a side entrance, and there is also a vestry with a separate entrance for the accommodation of the choir. A new kitchen for the use of parties has been provided in connexion with the present school building. The building throughout will be heated with small-bore hot-water pipes on the high-pressure system, and the lighting will be by incandescent gas lamps. The building is carried out in red stock bricks, with dressings of buff terra-cotta. The windows are glazed with leaded glass, and the roof is slated. The woodwork generally and the seating and platform are in redwood, and all internal woodwork is varnished. The contract for the building has been carried out by Mr. Walker Sanderson, of Hull, from the plans and under the supervision of Mr. W. H. Lingley, architect, Hull.

ST. MARY'S CHURCH, CARDIFF.—Additions have been built at the north-east corner of this church, consisting of a choir vestry, 25 ft. by 17 ft. 6 in., and a priests' vestry, 17 ft. 6 in. by 12 ft., divided by a sliding partition, in order that the entire space may be used as one large room when so required. A vestibule and lavatory accommodation are also provided. The architect was Mr. G. E. Halliday, of Cardiff, and the work has been carried out by Mr. C. C. Dunn, also of Cardiff.

SYNAGOGUE, MANCHESTER.—On September 2, Dr. Adler, the Chief Rabbi, consecrated the synagogue which has been built in Higher Broughton, after Mr. Delissa Joseph's plans and designs, at a cost of 6,000*l.*, and with accommodation for 420 worshippers.

CHAPEL EXTENSION, KETLEY BANK.—The Primitive Methodist Chapel at Ketley Bank is being renovated and enlarged. The original front of the chapel is being rebuilt and the building lengthened. In connexion with the schoolroom there are to be three new class-rooms, a new heating apparatus is being installed, the kitchen and heating chamber being situated beneath the new rooms. The architects are Messrs. Elijah Jones & Jackson, of Wellington and Hanley, and the contract is being executed by Messrs. John Blakemore & Son, of Oakengates.

COUNTY SCHOOL, SOUTHALL.—The new school erected by the Middlesex County Council in Villiers-road has just been opened. Accommodation is provided for 250 students, the cookery and manual training centres being in a separate block so as to be available for use by outside students without interfering with the school work. The buildings have been erected from plans prepared by Mr. H. G. Crothall, architect to the Middlesex Education Committee, the builders being Messrs. Dorey & Co., of Brentford, whose contract price was 11,125*l.*

BOARD SCHOOL, KIRKCALDY.—A new school, to be known as the North School, has been built by the Kirkcaldy School Board. The building has accommodation for 1,000 pupils. On the ground floor is a central hall, 86 ft. long by 20 ft. broad, with classrooms on either side. On this floor are seven rooms, in addition to the cookery and laundry departments, the latter having a separate entrance from the east side of the building. There are also cloak-rooms and rooms for the teachers. In the basement the heating chamber has been placed. On the upper flat there is a hall and gallery running the whole length of the building, with ten classrooms. The architect for the school was Mr. D. Forbes Smith, Kirkcaldy, the plans being selected in a competition. The contractors for the work were: Mason, Balfour Bros., Kirkcaldy; joiners, Bogie & Nicol, Kirkcaldy; plasterers, W. & J. Easton, Kirkcaldy; plumbers, Jas. Wood & Sons, Kirkcaldy; slaters, Currie & Cant,

Kirkcaldy; iron work, Thomson Bros., Kirkcaldy; tile work, Daniel Ryrie, Edinburgh; glaziers, Cunningham & Co., Edinburgh; heating and ventilating engineers, M'Kenzie & Moncur, Edinburgh; electric light, Oliver Melville, Kirkcaldy. The estimated cost of the building is 10,000*l.*

NEW SCHOOL, BATTLEFIELD.—Battlefield Public School, erected at Carmichael-place by Cathcart Parish School Board, was recently opened by Sir Charles Bine Renshaw, Bart. The new school has accommodation for 600 scholars, but is so arranged that it can be enlarged to provide places for 1,200. The whole accommodation is on one floor, and consists of a drill hall, ten classrooms opening off an assembly hall, etc. Each of the classrooms has a separate cloak-room abutting on it. The architect was Mr. Andrew Balfour, Glasgow.

ROMAN CATHOLIC SCHOOL, EDINBURGH.—A higher grade Roman Catholic School, to be known as Holy Cross Academy, has been erected at Edinburgh. Mr. Johnston, of Leith, was the architect of the building.

METHODIST SCHOOLS, LISBURN.—New Methodist schools are being erected on a site in Seymour-street, Lisburn. The work is being carried out by Mr. James M'Nally, Lisburn, from plans prepared by Mr. St. J. Phillips, architect, of Belfast.

COUNCIL SCHOOLS, SMETHWICK.—New elementary schools have been built in Waterloo-road, Smethwick. The schools form the first complete block erected by the Education Committee, and the work has been carried out at a cost of slightly over 14,000*l.* (including the site). The premises are two-storied, with departments for boys and girls, each to accommodate 500, whilst there is a space for a further extension in order to make provision for a similar number of infants. In addition a manual training centre for woodwork has been erected. The architect was Mr. F. J. Gill.

SCHOOL ENLARGEMENT, SALINE, N.B.—The tenders for the additions which are to be made to the Saline Public School have been accepted, and are as follows: Mason work, Robert Anderson, Cowstrandburn; joiner, Henry Edward, Saline; slater, George Kean, Saline; plasterer, William Ure, Dunfermline; painter, James Walls, Dunfermline; plumber, Rolland & Co., Dunfermline; heating, D. Lowe & Son, Edinburgh; ventilating, Donald & Donald, Glasgow; The estimated cost of the building and furnishings is slightly over 2,000*l.* The architect is Mr. John Houston, Dunfermline.

PUBLIC OFFICES, WEST BRIDGFORD.—The new West Bridgford Public Offices have just been opened. The premises contain provision for the rate collector, surveyor and staff, and clerk, and a board-room with lavatory and cloak-room and storage accommodation. They are heated throughout with hot water. The building was designed by Mr. W. Pare, Surveyor to the Council, and is built of red brick with rough cast stucco.

THE NEW BURSLEM SCHOOL OF ART.—The new School of Art at Burslem has now been completed. The site of the school is in Queen-street, and covers an area of 2,171 sq. yds., whilst the frontage extends over 107 ft. The front elevation is faced with red brick, and the dressings are of tawny terra-cotta. The school is arranged on the central hall plan, the central hall giving access to all the rooms on the ground floor, and a balcony around the hall giving access to the rooms on the upper floor. In the centre of the frontage is the entrance porch and vestibule, in connexion with which are two small rooms for the secretary and attendant. Immediately beyond is the central hall, which will serve as the school museum. On the left of the central hall are two rooms, which communicate one with the other, and which will be used for elementary freehand, model, and light and shade drawing. Immediately to the right of the vestibule is a lecture room. To the right of the central hall, after entering it from the vestibule, is an open staircase leading to the upper floor, and further along on the right, there is a pottery decoration room. At the far end of the hall is the crafts room. The staircase communicates with the central hall balcony, which gives access to the chief rooms of the school. At the front of the building are the painting and antique room and the life room. Adjoining are the library, the modelling and casting rooms. On the opposite side is the advanced design room, and connected with this room is a conservatory for plant study. At the far end of the first floor are a common room for students and the headmaster's office, out of which a staircase leads to a studio, with north light, which is intended for the use of the headmaster and advanced students. The floors of the building are of concrete and fireproof. The central hall, vestibule, and balcony are treated with the marble mosaic known as terrazzo, but all the other floors are laid with wood blocks. The central hall is covered with glass, and the light is distributed through an open well to the ground floor, enabling the hall to be used both below and above for the exhibition of works. The artificial lighting is by electricity, and the heating of the school is by the low-pressure hot-water system. With the exception of the central hall, which is panelled and painted white, the whole of the rooms are plastered and treated with distemper, the prevailing colour scheme being white to pale green. The architects are Messrs. A. R. Wood & Sons, and the builders Messrs. W. Grant & Sons. The total cost of the building is estimated at 8,000*l.*, exclusive of the site.

PUBLIC HALL, BLAIR ATHOLL, N.B.—The new public hall, armoury, mess-room, club-house, and sergeant-major's house for the Scottish Horse at Blair Atholl are now practically completed. The buildings form a group consisting of centre and two side wings. The centre contains the hall, seated for about 480 persons, exclusive of platform. This hall has an entrance vestibule, and ladies' and gentlemen's rooms behind the platform. From the entrance vestibule a door leads into the lobby of the east wing, in which is placed the sergeant's house and a large armoury and store-room. The west wing contains the club, consisting of a mess-room and sitting-room, writing room, bathroom, etc., and clubmaster's house. This wing has also internal communication with the large central hall by means of a doorway between it and the mess-room. The exterior mason work is roughly dressed blue limestone obtained from a quarry in the neighbourhood, while the hewn work about the doors and windows is of a light brown freestone from Elgin. The large hall is heated by means of hot-water pipes and radiators on the low-pressure heating system, and ventilated by means of numerous air inlets and a concealed extract ventilator on the roof. The following were the contractors: Mason work, W. & C. Duncan, Murthly; joiner work, Wm. Duncan, Blair Atholl; plaster work, William Campbell, Dunkeld; slater work, Donald Stewart, Dunkeld; plumber work, Macleish, Morrison & Co., Perth; blinds and belt work, A. Westwood & Son, Perth; painter work, A. Douglas & Son, Perth; heating work, Mackenzie & Moncur, Edinburgh. The architect was Mr. J. Macintyre Henry, of Messrs. Henry & Maclennan, Edinburgh, and the erection of the building was superintended by Mr. James Swan, clerk of works to the Duke of Atholl. The cost of the work, including furnishings, is somewhat under 3,000*l.*

BATHS AND WASH-HOUSES, SOUTH SHIELDS.—New baths and wash-houses have been erected by the South Shields Corporation in Derby-street at a cost of over 17,000*l.* The designs from which the building has been erected were selected in a competition confined to local architects, and are by Mr. J. H. Morton, of South Shields.

CO-OPERATIVE PREMISES, KELVEDON.—A new branch of the Tiptree Self-Help Co-operative Society has been opened at Kelvedon. The new premises are of brick, and were designed by Mr. Hudson, architect. Mr. H. Gurton was the builder.

Appointments.

BARROW-IN-FURNESS TECHNICAL SCHOOL.—The office of Principal has been conferred upon Mr. G. Grace, B.Sc., A.R.C.Sc., Principal of Doncaster Technical School.

WEAR COMMISSION.—The Wear Commissioners have appointed Mr. William Simpson, of Aberdeen, one of sixty-nine candidates, as their Resident Engineer.

RANGOON.—Mr. Launcelot P. Marshall, M.Inst.C.E., M.I.Mech.E., lately connected with the engineer's department of the Norwich Corporation, and at present holding an appointment on the engineering staff of the London County Council, has been appointed Chief Engineer to the Rangoon Municipality, Burma.

Sanitary and Engineering News.

NEATH WATER UNDERTAKING.—At a meeting of the Neath Rural District Council, held on the 4th inst., the tender of Messrs. Morrison & Mason, of Glasgow, of 88,932*l.* for constructing the dam for the Ystradfellte Waterworks was accepted. Messrs. Hill & Sons, of Westminster, are the consulting engineers.

NEW BRIDGE, LANGRICK.—A new bridge has been built over the river Witham at Langrick, near Boston, to replace the old boat ferry. The structure is a girder bridge in three spans, the two outside spans being 20 ft. each, and the centre span, across the river, 120 ft., the latter being carried on two brick piers, each 30 ft. long and 7 ft. wide, erected on a concrete foundation in the river bed supported on piles. The bridge is 22 ft. 6 in. wide, a footpath being laid on each side of the road. Messrs. Sherwin & Son, Boston, have done the building and road making, their contract being 3,786*l.* The ironwork has been constructed by the Butterley Ironworks Company, whose contract was 3,419*l.* 4s. 9d. The work has been done under the supervision of Mr. James Tropp, M.Inst.C.E., County Surveyor, Lincoln.

HOUSES AND SANITATION IN WOOLWICH.—Dr. Sidney Davies, Medical Officer of Health for Woolwich, gives in his annual report just issued the results of a special inquiry held with regard to housing conditions in North Woolwich. The comparative unhealthiness of the part of the borough known as North Woolwich has been repeatedly remarked upon. For the five years, 1901-6, the death rate was 17·8 as compared with 13·9 for the whole of the borough, and the infantile death rate for the same period was far higher than in any other ward. In the past five years the death rate from tuberculosis was 2·25 in the ward as compared with 1·46 in the borough. The age, distribution, and class of population did not account for the high death rate. The inhabitants are of a poor working class, but no poorer than is found in several wards. After considering all possible conditions that are unfavourable to health, the only one that seemed likely to explain the unhealthiness of North Woolwich is the character of the soil and condition of the ground water, which may be compared with that of a mud bank. A special inspection was made of 171 houses to discover defects of drainage and dampness of walls and sites, the drains being tested with the smoke test. The drains of twenty-nine houses were defective, and have been or are being relayed. Twenty-one houses were found to be damp, and measures taken for securing dryness; at fifteen ventilation was provided under the floors. Out of twenty-eight houses where cases of diarrhœa occurred seventeen were said to have been built within the last ten years, nine had sites without concrete, and four were damp; none showed any signs of house-refuse under the floors. The Borough Engineer obtained the following information from the District Engineer for the North Woolwich London County Council sewers as to the level of the ground water: "Observations were taken at a sump-hole excavated at the pumping station during a period of twenty-four hours. The greatest variation was 0·67 ft., or about 8 in., which occurred from two to four hours after high water, and the lowest level was at eight to twelve hours after high tide, or just preceding high water, showing that the ground water took about two hours to reach its maximum height." A section of the ground in the sump-hole shows 5 ft. of made up ground above, succeeded below by 13 ft. of Thames mud, 3 ft. of peat, and 6 ft. of sand. In cuttings made for new sewers it is frequently found that the street has been made up with house-refuse, and there can be no doubt that the surface soil of North Woolwich largely consists of made up ground. Though the actual sites of houses were not usually of such ground, the impurity of the surrounding soil must have a considerable effect in making the air impure. The ebb and flow of the tide in the ground would drive impure air out of the soil, and where sites of houses are not concreted such air would be specially drawn into them. The impurity of the ground was further increased by the defective drainage previously existing, but which has now been for the most part remedied. The organic constituents of the impure soil will slowly be oxidised and an ultimate greater purity of the soil be attained; but this will take many years. Meanwhile, no other practical steps can be suggested beyond a diligent prosecution of the house-inspection and health-visiting which are now being carried out. It was satisfactory to find that though the death rate of that part of the borough known as North Woolwich was high, it is yet lower than that of the adjoining parts of East and West Ham. This is shown in Dr. Sowden's annual report on the health of East Ham, in which he points out that in each of the three boroughs the wards which are situated on low-lying, damp, alluvial soil have much greater death rates than the remainder of each borough. In another portion of his report Dr. Davies says that owing to reduction of work in the Royal Arsenal and trade depression, there have been in recent years a large number of empty houses or unoccupied rooms as compared with previous years. For the year ending December 30, 1906, the estimated number of uninhabited houses in the borough was 3·8 per cent. On the other hand 560 new houses were passed for water certificates in 1905, and 418 in 1904, and observation showed that new houses are usually occupied as soon as they are completed. This apparent anomaly is partly explained by the fact that the great majority of the new houses are four or five-roomed dwellings, or consist of two flats of separately contained three or four-roomed tenements, whereas four-fifths of the empties in 1904 were rented over 10s. a week, a rent beyond the means of the majority of the population. The general demand is for a small separate house.

THE LONDON COUNTY COUNCIL NORTHERN OUTFALL SEWER.—At the meeting of the East Ham Town Council on Tuesday, the Chief Sanitary Inspector reported as to a nuisance caused from smells emanating from the surface grids on the Northern outfall Sewer Embankment. In connexion therewith the Engineer stated that he had interviewed the Chief Engineer of the London County Council, with the result that surface

grids on the sewer along and in front of the hospital site have now been closed. The Town Council's Engineer was directed to further negotiate for the closing of the grids up to High-street South, and report thereon at a subsequent meeting.

Foreign.

FRANCE.—A new Hotel des Postes is to be built at Versailles, at the angle of the Rue de Limoges and Rue des Chantiers.——The Porte de Guillaume and the Porte de Nevers, at Saint-Valéry-sur-Somme, have been classed as "Monuments Historiques."——The Municipality of Havre have under consideration important works for the improvement of the port, at an estimated expenditure of 85 million francs.——It is proposed to form a basin on the Touques, at Trouville, with a barrage and weir, at a cost of 2,200,000 francs.——The Conseil Général du Nord have decided on the rebuilding of the Thermal establishment of Saint-Amand-les-Eaux, which was recently burned. The cost is estimated at 135,000 francs. They have also commissioned M. Duforêt as architect to carry out the enlargement of the Ecole Normale des Institutrices at the same place.——Important repairs are to be undertaken at the Palais de Justice at Angoulême, at a cost of 16,000 francs.——The Jury in the competition opened by the town of Dijon for the rebuilding of the Prefecture of the Côte d'Or have awarded the first premium to M. Compérot, of Dijon, and the second to M. Jardel, of Paris.——The Municipality of Thonon (Haute Savoie) have recently carried out important improvement works at a cost of 800,000 francs, of which sum 480,000 francs went to the building of a Communal College.——A new bridge is to be built at Montauban, at a cost of 800,000 francs.——At Chalon-sur-Saône a monument has been inaugurated in commemoration of the defence of the town in 1814. M. Moreau-Vauthier is the sculptor.——M. Audéoud, a wealthy amateur and collector, who died recently at Cairo, has left his whole fortune to the Louvre Museum.——A monument to the memory of Gambetta has been unveiled at Cavaillon; M. Felix Charpentier is the sculptor.——The Jury in the competition for a group of schools in the park at Neuilly-sur-Seine have awarded the first premium to M. Payret-Dortail, of Paris.——In spite of the many interruptions on account of strikes, the works of the metropolitan railway are progressing sufficiently well to give hope that they will be entirely completed in 1909. Line No. 5, from the Rue de Lancry to the Place d'Italie, will be opened next month, with its annexes communicating with the Gare de l'Est and du Nord. Line 6, from the Place de la Nation to the Place d'Italie, will probably be opened in January; and in March will probably take place the opening of a portion at least of Line No. 4, from Montmartre to the Porte d'Orléans. There remain the Lines 7 and 8. The last named, from the Opéra to Auteuil, is in course of execution, and will no doubt be opened in 1909.——The destruction is threatened of two very interesting old houses in the Place Dauphine, facing the open space opposite the Pont Neuf where the Henri IV. statue stands. They form one of the most interesting remnants of old Paris, and ought to have been classed by the Government among the "Monuments Historiques." It is hoped that the Vieux Paris Committee will intervene in time to save them.——The Department of Fine Arts will shortly undertake the necessary works for disengaging and preserving the Roman theatre at Lillebonne (Seine Inférieure), discovered in 1840.——The works are to be commenced shortly for the erection of a new Hôtel des Postes at Limoges, at an estimated cost of nearly a million francs.——A new graving-dock is to be commenced at St. Malo, at a cost of 540,000 francs.——The death is announced, at the age of 57, of M. Henri Lefebvre, architect, pupil of Daumet, and member of the Société Centrale des Architectes.

DAMASCUS ANTIQUES.—The British consul at Damascus (Mr. Devey) in his annual report just received at the Foreign Office, says: "Antiques, including glass articles taken from old tombs, white and black stone busts, old china, ancient coins, old pottery called kishani, and other sorts of articles left by the various nations that occupied this country in the past are sometimes smuggled through the different ports of Syria and Palestine to the markets of France, America, and the United Kingdom. The receipts for these antiques in this city last year were rather more than 6,000*l*. The Turkish Government prohibit any excavations without a permission, to be obtained with great difficulty from the Ministry of Public Instruction at Constantinople, and by a newly-issued regulation all antiques now found in Ottoman territory are the property of the State, and are apt to be kept at the Imperial Ottoman Museum; the finder is only allowed to take copies of them, draw pictures, or publish books on the subject. For this reason very few people care to apply for a legal exploration concession, but prefer to dig and search for antique objects secretly, without the knowledge of the authorities."

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—We are informed that Mr. Geo. J. Barton has, owing to ill-health, resigned his connexion with Messrs. Rownson, Drew and Clydesdale, Ltd. He was for over thirty years associated with the late firm of Rownson, Drew & Co., of 225, Upper Thames-street, E.C.——Messrs. Crapper & Co., sanitary engineers, are removing their offices, show-rooms, and warehouses, from Marlborough-road, Chelsea, to 120, King's-road, Chelsea, where they will be established on and after October 1.——Mr. Joseph Hamblet has resigned his connexion with Hamblet's Blue Brick Co., Ltd., of West Bromwich, after having been connected with the business as proprietor, managing director, and chairman for about forty years. All personal communications should be addressed "Joseph Hamblet, Eagle Works, West Bromwich."

VICTORIA EMBANKMENT TRAMWAYS.—The supply and erection of the steel work in the new tramway subway from Victoria-embankment to the Strand will be carried out by the Cleveland Bridge and Engineering Company of Darlington. The subway will be 20 ft. in uniform depth, and 23 ft. wide, for two tramway sets; the steel work, amounting to about 800 tons, consists mainly of plate girders with top-troughing and stanchions.

INLET VENTILATOR.—Messrs. E. H. Shorland & Brother (Manchester) have introduced a new inlet ventilator (Shorland's No. 221), made so that by one movement only the front of the ventilator can be removed, thus allowing for the whole of the interior of the ventilator being cleaned at any time from the inside of the room where the ventilator is fixed. The advantage of this method of cleaning the ventilator will at once be apparent, as by it there is no necessity to go outside the building to remove the air grating in the outer wall for the purpose of cleaning the inside of the ventilator.

INTERNATIONAL CONGRESS FOR HYGIENE AND DEMOGRAPHY.—Up to the present 2,500 applications have been received from intending members for the fourteenth International Congress for Hygiene and Demography, to be held at Berlin, September 23 to 29. As the number of applications on such occasions always grows larger and larger in the course of the last weeks, there might be some difficulty in procuring suitable lodgings. For that reason, and also to facilitate all necessary preparations, intending visitors are respectfully but urgently requested to send in their applications as soon as possible. As a large number of the members of the congress are already en route, it has not been possible to send the last "Conclusions" to the members living in distant countries. Members will, however, be handed everything they require in connexion with the congress on calling at the offices on their arrival.

MEMORIAL TO LORD ST. HELIER.—Lady St. Helier has presented a marble bust, sculptured by Mr. Emil Fuchs, of her husband, the late President of the Probate, Divorce, and Admiralty Division, which will be set up on the court floor, Royal Courts of Justice, near the busts of Sir George Jessel and Earl Cairns.

A STATUE OF THE EMPEROR CONSTANTIN PALEOLOGUE.—An international competition will be adjudged at Rome between June 18—October 28, next year, in respect of the scheme for erecting a statue to the Greek Emperor, who was killed in 1453 in the defence of Constantinople. Competing artists are invited to prepare models of their designs for a memorial to comprise a statue and pedestal to be executed in marble, with bas-reliefs in bronze.

PARISH CHURCH, ALDINGTON, KENT.—A fund is opened for the completion of the tower of the parish church of St. Martin, Aldington, near Hythe, as a memorial jointly to Erasmus and Archbishop Warham of Canterbury. Warham began the building of the church tower, which forms a conspicuous feature on the heights near Lympne. In compliance with Henry VIII.'s request, Warham presented Erasmus to the living in 1511. In that year Erasmus was appointed Lady Margaret's Professor of Divinity at Cambridge, and had gone into residence at Queens' College. He quitted England three years afterwards.

UNION OF BENEFICES, CHARLTON.—A commission has resolved upon a union of the benefices of St. Luke and St. Paul, Charlton, in the rural deanery of Woolwich. The church of St. Paul was built, after W. Wigginton's designs, in the Gothic style, for a congregation of 890 persons, in 1866–7. The parish church of St. Luke, which contains 270 sittings, was rebuilt of red brick in 1639–40 with an embattled tower, and was enlarged seventy years ago. Of the many monuments, that to Sir Adam Newton (1630) is by Nicholas Stone, who was paid 180*l*. for it. The church claims to be one of the first Protestant churches built in England.

TWO DECEASED ARCHITECTS' ESTATES.—The estates of the late Mr. E. Augustus Hughes, of London, and Mr. J. A. Chatwin, of Birmingham, amount to 95,037*l*. and 40,717*l*. respectively.

LONDON COUNTY COUNCIL EVENING SCHOOLS.—The London County Council desires to call attention to the facilities offered for evening instruction in the various institutions maintained by it or under its control. In the various polytechnics, technical institutes, and schools of art situated in the county, classes in science, art and technology, music, artistic handicrafts, etc., will be re-opened towards the end of the present month. These institutions provide instruction of an advanced or technical character. Every facility is offered to different types of students to supplement workshop, office, or studio practice by evening study under the most favourable conditions. Courses are arranged, where necessary, to prepare professional students for various examinations, art students for the examination of the Board of Education, and artisans for the examinations of the City and Guilds of London Institute, etc. These centres are in a degree contributory to the polytechnics and technical institutes mentioned above, and are primarily intended for students not sufficiently advanced for the polytechnic classes. Advanced work, however, is taken in many of the subjects. The instruction given in these centres includes commercial subjects, such as accountancy, banking and currency, commercial law, book-keeping, commercial correspondence, shorthand, typewriting, and modern languages; science subjects, such as physiology, geology, mathematics, chemistry, hygiene, building and machine construction; and art subjects, such as drawing in light and shade, model, freehand and geometrical drawing, memory drawing of plant form and common objects. The fees vary from 1s. 6d. to 5s. the session for one or more subjects according to the age of the student and the character of the subjects taken. In 237 London County Council school buildings situated in every part of London ordinary evening schools will be opened this session. The instruction will, as a rule, be of a character preparatory to that given in the centres, and will embrace commercial subjects, such as book-keeping, shorthand, and modern languages, and general subjects such as arithmetic, geography, history, and composition. Women and girls will be able to receive lessons in practical cookery, dressmaking, millinery, needlework, and laundry work; and instruction in woodwork will be provided for men and boys. Gymnastics will be taught, and lectures by doctors and nurses on first aid, home nursing, health and infant care will be given. There are eleven special schools which provide suitable instruction for the deaf. In fifty-eight schools situated in poor districts no fees will be charged to any students, but as a rule a charge of one shilling for the session for one or more subjects will be made in the remainder of the schools. Those who desire further information concerning these institutions should apply to the schoolkeeper of any of the Council's schools for a handbill giving particulars of the various institutions in the district.

MEMORIAL TO THE LATE DR. ANDREW BALFOUR, J.P., PORTOBELLO.—A public memorial to the late Dr. Andrew Balfour, J.P., Portobello, has been placed in Portobello Cemetery. Mr. John S. Rhind, Edinburgh, was responsible for the design and execution of the monument, which is in the form of a granite obelisk standing 13 ft. high, with a portrait panel in bronze in low relief set in the front of the column.

PRIVATE STREET IMPROVEMENTS, DARLINGTON.—An inquiry was held at the Darlington Town Hall on the 3rd inst. by Mr. A. G. Drury, A.M.I.C.E., Inspector of the Local Government Board, into a proposal by the Corporation to borrow 6,797*l*. for works of private street improvement. Mr. Winter, the Borough Surveyor, was among those who gave evidence.

THE BEXHILL PATENT CASEMENT.—Messrs. Campbell, Smith, & Co., have submitted to us a model of the window called by the above title, of which they have secured the patent rights. It is an entirely new device. Each division of the window consists of two casements hung together at the centre, the ends are supported at the top and bottom in metal shoes which are pivoted to runner blocks sliding in the upper and lower channel guides. The lower runner blocks are fitted with teeth which are engaged by a rack raised and lowered by the lever handle. The object of this rack, which works against the lower side of the runner blocks, is to lock the window either shut, or in any desired position when open. The window is opened by pushing the handle on the centre bars, when the centre is pushed outward and the sides moved towards the centre on the runner blocks, the open window assuming the form of an acute or obtuse angle (according as it is more or less opened) projecting outwards. In this position the exterior of the glass is easily reached for cleaning. When closed the window

has the advantage over the ordinary casement window of having the sides in a groove in the same way as a sash window. The joinery would cost no more to produce than in ordinary casements and frames; the frame requires careful making and fitting to work well, but otherwise it is not expensive. It seems to us, as far as we can judge by the working of a model on a small scale, to be one of the best and most workmanlike of the numerous devices in windows that have come before us at different times. Once well made, there is nothing in it to get out of order, and it has some of the practical advantages of the sash window without its disadvantages.

DEMOLITION OF A CHIMNEY STACK.—Mr. William Larkins, of Bow, steeplejack, has successfully "thrown" the stack at Par, Cornwall, which was erected about seventy years ago for silver-lead smelting works. The chimney, 275 ft. high, resting upon a sub-structure of granite, weighed, it is estimated, some 3,000 tons. Mr. Larkins thinned the base of the walls to the extent of one-and-a-half brick, and then cut half way around the stone work at the base to a depth of 3 ft.

PUBLIC LIBRARY, FULHAM.—The committee desire to obtain funds for the erection of a new central library to replace their present premises. The existing library, on the north side of the high-road from Walham Green to Fulham, is an old house, ill adapted for the purpose, and its frequent repair involves considerable expense.

Legal.

ANCIENT LIGHT DISPUTE.

THE case of Louis *v.* The Co-operative Wholesale Society, Ltd., came before Mr. Justice Parker, sitting as Vacation Judge, on Wednesday last on a motion on behalf of the plaintiff for an *interim* injunction restraining the defendants until the trial or further order from proceeding with the erection of a certain building so as to obstruct the plaintiff's ancient lights.

Counsel, in support of the application, stated that the defendants had recently pulled down a building which was 31 ft. high, and proposed to erect on the site a building of 61 ft. high, which would seriously obstruct the light of the plaintiff's premises.

Counsel for the defendants said he had not had sufficient time to read and consider the affidavits filed in support of the motion on behalf of the plaintiff, and he applied that it might stand over for a fortnight for this purpose. If this were done the defendants were prepared to give an undertaking that they would not increase the height of their building during that period.

The plaintiff assenting to this arrangement, his lordship directed the motion to stand over on the terms stated.

Patents of the Week.

APPLICATIONS PUBLISHED.*

17,757 of 1906.—D. O'BRIEN: *Earth Closets.*

This relates to a closet or privy with a pipe or chamber on the inside of the front of the pan with a flaring mouth to receive and keep the urine separate from the solid excreta.

18,063 of 1906.—J. HAZZLEWOOD and C. FORREST: *Expansion Joint for Hot Water or Steam Pipes.*

This relates to an expansion joint and coupling to be applicable either combined or as an expansion chamber only for hot water and steam pipes of any description, and is constructed so that it may take up the usual expansion and allow for contraction in hot water and steam pipes without fracturing any joints or connexions in the aforesaid pipes, this being obtained by means of a corrugated elastic chamber made of copper or any other suitable material which is of sufficient strength to stand the pressure of steam or hot water, but which by its shape and construction is elastic enough to take up and allow for the expansion and contraction in the pipes caused by different temperatures.

18,244 of 1906.—W. E. WHITESIDE: *Door Handles.*

This relates to door handles, and consists in the use of a metal neck in combination with a knob and rose of wood or other suitable materials other than a metal knob.

18,510 of 1906.—F. HERRMANN: *Conveying Device for the Unburnt Bricks Produced in Moulding Presses.*

This relates to a conveying device for unburnt bricks produced in moulding presses in which the conveyor automatically receives the bricks from the cutting table, the distinguishing feature being that the conveying device can be arranged in or under the cutting table, and that by an alteration in the height of its bearing surface the bricks previously cut from the stream of clay are taken off by it and thereupon separated.

20,067 of 1906.—A. COWPER: *Hatch for Earth Closets and similar receptacles.*

This relates to a hatch for earth closets, ash closets and the like, comprising the combination of a frame adapted to be built into the wall flush with the face thereof, and preferably formed of loose or separate side members, a top plate and a base plate suitably assembled or fitted together so that any part may be renewed, a door adapted to slide vertically in said frame, a retaining ledge on said frame adapted to support the door in its raised or open position, and stops on said door coacting with stops on said frame to prevent the door being entirely removed therefrom.

20,456 of 1906.—A. BLOCH: *Electric Alarm Devices for Notifying Attempts at Breaking or Opening Locks.*

This relates to an electric alarm apparatus comprising the arrangement of a board for receiving the keys when the apartments are vacated, the construction of this device being such that each key establishes electrical connexion between a spring and hook, thus closing the circuit between the lock of the respective room and an alarm.

22,739A of 1906.—T. SULLIVAN: *Spring Checks for Doors.*

This relates to a check for doors, and is characterised by the same being formed from a flat oblong spring bent upon itself so as to form a striking face or faces adapted to give or spring when in contact with the door frame or door, with a dent or joggle adjacent to said striking face or faces to engage with the door frame or door to hold the door in its closed or partly closed position, said check being attached at its ends by screws or the like to the door or frame.

23,145 of 1906.—W. E. HIPKINS and M. KURREIN: *Testing Machinery or other Machinery wherein Strain or Pressure is applied.*

This relates to testing machines and the like wherein compressive force or strain is applied, and comprises a compression plate or platen consisting essentially of a face plate mounted on a hemispherical seat, said seat having bearing in the concave recess of a fixed seating attached to the crosshead of the machine, and having a convex surface concentric to the concave recess whereon can bear and travel a collar carried by a rod or bolt secured to the axis of the hemispherical seat, said rod or bolt being provided with a nut or nut and spring, and having axial motion within a central opening through the fixed seating.

23,924 of 1906.—C. E. WELSTEAD: *Metal or other Window Casements and the like.*

This relates to side-hung casements, and comprises the combination with a fixed portion of an outer frame on a movable portion hinged thereto, an inner opening frame hinged to the hinged portion of the frame, and a catch adapted to engage in a recess in the window sill or in a recess of the socket carried by the inner opening frame according as the casement is to be opened inwards or outwards.

24,013 of 1906.—J. BROWN: *Device for Coupling Together Lengths of Flexible or Rigid Tubes for the Conveyance of Fluids or Gases under Pressure.*

This relates to a coupling comprising male and female parts, and consists in providing trunnion pins on the one part adapted to fit into hooks on the other part, and a sleeve whereby said male and female parts may be locked.

25,734 of 1906.—G. CASELLI: *Means for Sawing and Dressing Marble and Other Stone.*

This relates to a tool to take the place of the ordinary saw-blades and the like heretofore employed for sawing stone, and characterised by toothed wheels fitted with proper cutting edges mounted obliquely in a reciprocating plate and caused to revolve by the motion of the said plate on which they are loosely journalled.

4,177 of 1907.—L. ECSÉRY: *Safety Devices for Door-locks and the like.*

This relates to a safety device for door-locks and the like of that kind which is introduced into the lock through the key-hole after the lock has been locked and the door key has been withdrawn, and is locked in position in the lock by means of an adjusting key, and consists in the employment of a groove in the socket and a corresponding stud on the adjusting key in combination with the shaped ends of the said key and of the rotatable pin, so that, by varying the shape of the said ends and the position of the said groove and stud in relation to such ends, a very great number of variations can be produced whereby the greatest possible security against the unauthorised removal of the safety device from the lock can be attained.

6,988 of 1907.—R. ROTHWELL: *Means for Displaying Colours for Use in Wall Decoration.*

This relates to means for use in displaying colours or tints or the like for wall decoration, and comprises the combination with a book-back having an opening in the front cover, of a number of sheets of paper of equal size bearing the colours or tints to be displayed, said sheets being so held to the book-back as to be capable of being swivelled to various positions and of being caused to show through the said opening in such manner as to display the colours for the filling-dado, and skirting-board, or filling and skirting, board only in the same relationship and proportions as they would appear on a wall.

10,199 of 1907.—S. H. PRIDEAUX and F. F. PRIDEAUX: *Pipe Couplings.*

This relates to a coupling for hose and like pipes, and comprises the combination of a socket part having external lugs thereon, and having slots cut partly longitudinally and partly circumferentially, a spring-pressed sleeve fitted on said socket part, and a spigot part capable of angular movement relative to the socket part, and having lugs to engage said slots and simultaneously push back the spring-pressed sleeve and so afford a bayonet joint connexion in said socket and spigot parts, the spring-pressed sleeve having notches in line with the lugs but out of line with the longitudinal notches.

10,957 of 1907.—P. W. GRASZYNSKI: *Devices for the Protection of Audiences in Theatres and the like from Fire.*

This relates to a device for protecting people against fire in theatres, concert-halls, and other assembly rooms, comprising slides which, when there is danger from fire, take the place of the floor of the stalls, which is lowered in the known manner, and with which said slides are in positive connexion for shutting off the spectators' room in a fire-and-smoke-tight manner.

11,490 of 1907.—W. E. GROUT and G. R. GROUT: *Windows.*

This relates to windows, and has for its object to enable the outside of the glass to be turned inwardly for cleaning, and comprises the combination with the pivoted frame, of the outer frame, a member on the outer frame being so arranged that the pivoted frames abut against it when closed.

11,908 of 1907.—J. C. MILHOLLIN: *Spring Hinges.*

This relates to a separable spring hinge comprising two hinge members having overlapping apertured pivot lugs and an auxiliary member having apertured pivot lugs, the pivot lugs of said members being so arranged that their apertures register to receive the hinge pintle, and one of said members being provided with a sleeve or support about which is coiled a spring having one end in engagement with said hinge members and the other end in engagement with said auxiliary member which in turn bears upon the other hinge member, thus causing the spring to act upon both of said hinge members.

14,044 of 1907.—O. SCHUBERT: *Cowls.*

This relates to a cowl comprising two superposed tubular sections connected by a ball-and-socket joint whereby the top section can yield in the direction of the wind.

22,363 of 1906.—H. WHARTON: *Pulley Blocks and similar Hoisting Gear.*

This relates to a pulley block, and consists in providing upon the pulley-chain-wheel a number of movable pieces to automatically fly outwardly when the load runs down to frictionally contact a braking annulus, formed by a fixed or movable part concentric to the axis of the chain wheel, by a movement which is eccentric to the axis of the chain-wheel and annulus, or which is in an arc cutting the surface of the annulus.

29,635 of 1906.—J. B. STRAUSS: *Bascule Bridges.*

This relates to a bascule bridge comprising a main span provided with main trusses mounted upon trunnions, a pair of fixed supports at each side of the main span, each truss being between the two members of the associated fixed supports, and a pin-connected counter-weight connected with the rear end of the main span, the fixed supports being out of the path of the counter-weight, so that part of the counter-weight proper passes by and in front of said supports when the bridge is open.

7,638 of 1907.—G. A. WAYSS: *Process and Apparatus for the Manufacture of Hollow Bodies Especially Suitable for Filling Cavities in Concrete Structures.*

This relates to a process for the construction of hollow bodies, specially suitable for filling cavities in concrete structures, wherein a common flexible coating of cane fabric is, by means of bands wound over the latter under tensions, secured upon frames kept at parallel distances from one another.

7,748 of 1907.—R. BOCK: *Toggle Lever-presses.*

This relates to toggle lever-presses with two dies adapted to be moved towards each other by link work connecting and operating them, and consists in relieving the link work and dies of weight by hydraulic pressure in order that the dies shall exert an equal or nearly equal pressure on both sides of the material to be pressed.

PATENTS.—*Continued on page 302.*

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xx.; Auction Sales, xxx.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

***** It must be understood that the following paragraphs are printed as news, and not as advertisements: and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.**

Competitions.

OCTOBER 15.—**Cemaes.**—DRAINAGE.—The Twrcelyn R.D.C. invite plans and specifications, in competition, for a drainage scheme for the village of Cemaes. Although a drainage scheme for the whole of the village is asked for, it is understood that that portion of the scheme relating to the developed portion of the village only will be proceeded with. Competitors are requested to state the remuneration required by them for the plans, specifications, and supervision of the work. Mr. Thomas Hughes, Clerk to the Twrcelyn R.D.C., Brynaethwy, Menai Bridge.

* JANUARY 31.—**Bootle.**—NEW SCHOOL.—The Bootle Education Committee invite competitive designs for a new Council Public Elementary School for 1,000 children. For further particulars refer to an advertisement in this issue.

Contracts.

BUILDING.

SEPTEMBER 15.—**Leeds.**—BRICK CHIMNEY.—Tenders are invited for building a brick chimney. For specifications and particulars apply to Mr. Hill, architect, Oxford-row, Leeds.

SEPTEMBER 16.—**Threemilehouse.**—PAROCHIAL HOUSE.—Tenders are invited for the erection and completion of a parochial house at Threemilehouse, Co. Monaghan, for the Rev. Michael Doherty, P.P. Copies of the plans and specifications can be obtained on application to Mr. J. J. M'Donnell, architect, 27, Chichester-street, Belfast.

SEPTEMBER 17.—**Rochester.**—ALTERATIONS TO MUNICIPAL OFFICES.—Rochester Corporation invite tenders for carrying out certain alterations and additions to the Municipal Offices. Plans and specifications can be seen, and forms of tender obtained, on application to Mr. William Banks, A.M.Inst.C.E., City Surveyor, Guildhall, Rochester.

SEPTEMBER 17.—**Shoeburyness.**—COUNCIL OFFICES AND FIRE STATION.—Shoeburyness U.D.C. invite tenders for the erection of council chamber offices and fire station, situate in High-street, Shoeburyness. Plans and specification may be seen at the offices of the architects, Messrs. Burles and Harris, Clarence-chambers, Southend-on-Sea.

SEPTEMBER 18.—**Kirkinner.**—PUBLIC HALL ALTERATIONS.—Tenders are invited for the mason, joiner, slater, plumber, and painter works of additions to and alterations on Kirkinner Public Hall. Plans and specifications may be seen at the office of Mr. D. K. Park, architect, Newton-Stewart.

SEPTEMBER 18.—**Middleton.**—DUTCH BARN.—Corporation of Middleton invite tenders for the erection of a Dutch barn in Rochdale-road, near the Black Bull. Plans may be seen, and specifications, quantities, and form of tender obtained on payment of 10s. 6d., on application to Mr. W. Welburn, Borough Surveyor, at his office, Town Hall, Middleton, between the hours of 9.30 and 10.30 a.m.

SEPTEMBER 18.—**Pontypridd.**—PULLING DOWN AND RE-ERECTION OF PREMISES.—Tenders are invited for the pulling down and re-erection of certain premises in Taff-street, Pontypridd, for Messrs. C. G. Roberts and Sons. Plans and specification may be seen and forms of tender obtained from Mr. Arthur Ll. Thomas, A.M.I.M.E., architect and surveyor, Church-street-chambers, Pontypridd.

SEPTEMBER 18.—**Sheffield.**—UNDERGROUND CONVENIENCES.—Sheffield Health Committee invite tenders for the construction of underground conveniences in Castlefolds. Specifications and plans may be seen and quantities obtained at the City Surveyor's office, on payment of 10s.

* SEPTEMBER 18.—**Sutton, etc. (Essex).**—NEW SCHOOLS.—The Essex Education Committee invite tenders for the erection of new schools at Sutton, Thundersley, and Rayleigh. For further particulars refer to an advertisement in this issue.

SEPTEMBER 19.—**Illogan.**—DWELLING-HOUSE.—Tenders are invited for the erection of a dwelling-house at Broad-lane, Illogan, according to plans and specifications, which may be seen at the residence of the proprietor, Mr. George May, Broad-lane, Illogan, or by appointment at the offices of Mr. Leonard Winn, architect and surveyor, 27, Boscawen-street, Truro, and the Free Library-chambers, Redruth.

SEPTEMBER 19.—**Newtownhamilton.**—ALTERATIONS, ETC.—Tenders are invited for alterations and seating of the Presbyterian Church, Newtownhamilton, County of Armagh. Plans and specification may be inspected at the office of Mr. S. Wilson Reside, architect, Margaret-square, Newry.

* SEPTEMBER 19.—**Purley.**—PUBLIC CONVENIENCE.—The Croydon R.D.C. invite tenders for a public convenience at Purley. For further particulars refer to an advertisement in this issue.

SEPTEMBER 19.—**Scunthorpe.**—ELEMENTARY SCHOOL.—Lindsey C.C. Education Committee invite tenders for the erection of a higher elementary school and pupil teachers' centre at Scunthorpe. Bills of quantities and form of tender may be had on application to Messrs. Scorer and Gamble, architects, Bank-street Chambers, Lincoln, on payment to them of 3*l.* 3s. The drawings and the conditions of contract may be inspected at the offices of the architects.

SEPTEMBER 19.—**Sidcup.**—REPAIRS.—Greenwich Guardians invite tenders for reinstating damage caused by fire at the administrative block of the Children's Homes at Sidcup, Kent, in accordance with plans and specifications prepared by Messrs. Thomas Dinwiddy and Sons, of 54, Parliament-street, S.W., and Greenwich, from whom a copy of the bill of quantities with form of tender may be obtained upon deposit of 2*l.*, and the drawings and specification may be seen at their offices, 12, Crooms-hill, Greenwich.

SEPTEMBER 19.—**Sunderland.**—SCHOOL.—Council of the County Borough of Sunderland invite tenders for a proposed new school at The Green, Sunderland. Drawings and specifications may be seen and form of tender obtained at the office of Mr. C. A. Clayton Greene, 18, Norfolk-street, Sunderland, by whom bills of quantities will be supplied on payment to him of a deposit of 2*l.* 2s.

* SEPTEMBER 21.—**Chichester.**—ADDITIONS, ETC., TO SCHOOL.—The West Sussex and Chichester Joint Education Committee invite tenders for alterations and additions to the Bosham Council School, near Chichester. For further particulars refer to an advertisement in this issue.

SEPTEMBER 21.—**Hirwain.**—COTTAGES AND VILLAS.—Tenders are invited for building ten cottages and eight semi-detached villas at Hirwain, Glam., for the Tudor Building Club, Hirwain. Plans and specification can be seen either with Mr. J. B. Young, estate offices, Hirwain, or at office of Mr. T. Roderick, architect, Ashbrook House, Clifton-street, Aberdare.

SEPTEMBER 23.—**Hull.**—CLUB PREMISES.—Tenders are invited for the demolition of the existing buildings now upon the site, and for the erection of new club premises in West Dock-avenue, Hull, for the St. Andrews Recreation Club Company, Ltd. Drawings, specifications, and conditions of contract can be seen, and bills of quantities obtained, on payment of 1*l.*, from Mr. Arthur Easton, architect and surveyor, 7, Land-of-Green-Ginger, Hull.

SEPTEMBER 23.—**Oakmere.**—POLICE-STATION ALTERATIONS.—Tenders are required for alterations and additions to the County Police-station at Oakmere, Cheshire. Plans and specifications can be seen at the office of Mr. H. Beswick, County Architect, Chester, on and after September 9, and quantities obtained on deposit of 1*l.*

SEPTEMBER 23.—**Pontypridd.**—HOUSES.—Tenders are invited for the erection of forty houses, with roads, lanes, and sewers, at Pontypridd, for the Maes-y-coed Building Club. Plans and specification may be seen at office of Mr. Arthur Lloyd Thomas, A.M.I.M.E., architect and surveyor, Church-street-chambers, Pontypridd.

SEPTEMBER 23.—**Westoning.**—RESIDENCE.—Tenders are invited for the erection of residence at Westoning, near Ampthill, Beds. Plans and specifications can be seen at office of Mr. E. T. Tutt, F.S.I., chartered surveyor, Market-place, Ampthill.

SEPTEMBER 24.—**Calveley.**—SCHOOL ALTERATIONS.—Administrative Sub-Committee for the Nantwich Union Area invite tenders for alterations at the Calveley Council School. Plans and specifications can be seen at the office of Mr. H. Beswick, County Architect, Newgate-street, Chester, and quantities obtained on deposit of 1*l.*

SEPTEMBER 25.—**Middleton.**—COTTON SHED.—Lancashire and Yorkshire Railway directors invite tenders for the construction of a cotton shed at Middleton. Plans can be seen and copies of tender, quantities, and specification obtained on application at the engineer's office, Hunt's Bank, Manchester.

* SEPTEMBER 25.—**Watford.**—NEW SCHOOL.—The Hertfordshire C.C. Education Committee invite tenders for the erection and completion of a new school for 960 children. For further particulars refer to an advertisement in this issue.

SEPTEMBER 27.—**Birmingham.**—WORKHOUSE ADDITION.—Birmingham Guardians invite tenders for the erection of accommodation for "able-bodied" inmates at the Birmingham Workhouse. The plans can be inspected and particulars obtained from the architect, Mr. W. H. Ward, Paradise-street, Birmingham.

* SEPTEMBER 27.—**London.**—SORTING OFFICE.—The Commissioners of H.M. Works, etc., invite tenders for the enlargement of the Holloway Sorting Office, Hornsey-road, N. For further particulars see advertisement in this issue.

OCTOBER 3.—**Bagenalstown.**—FEVER PAVILION.—Carlow Guardians invite tenders for the erection of a new fever pavilion at the Hospital, Bagenalstown, Co. Carlow, in accordance with plan and specification prepared by Mr. James O'Donnell, A.M.Inst.C.E., Engineer to the Board of Guardians. Forms of tender and copies of bills of quantities (the latter prepared by Mr. George Metcalfe, College Park-chambers, Nassau-street, Dublin) can be obtained from Mr. Thos. F. Coyle, Clerk of the Union, Clerk's Office, Workhouse, Carlow, on payment of 3*l.* 3s.

OCTOBER 22.—**Dublin.**—COLLEGE BUILDING AND WORKSHOPS.—The Commissioners of Public Works in Ireland invite tenders for the superstructure of the Royal College of Science in Upper Merrion-street, Dublin, and for the erection of workshops adjoining, on and after September 16. Bills of quantities for each work, and form of tender, may be obtained on application to the Secretary, Office of Public Works, Upper Merrion-street, Dublin, on the payment of 5*l.* 5s., and the drawings and specifications may be seen at the offices of the Commissioners between 10 a.m. and 5 p.m. each day on and after the same date.

OCTOBER 26.—**Leiston.**—HIGHER ELEMENTARY SCHOOL.—East Suffolk County Education Committee invite tenders for the erection of a new higher elementary Council school and cookery, laundry, and manual instruction special subjects' centres at Leiston. Drawings, specifications, and form of contract may be seen after October 7 at the office of the Architect, Mr. E. Thos. Johns, Tower-chambers, Ipswich, between the hours of 10 a.m. and 5 p.m., and at the offices of the Education Committee, County Hall, Ipswich, between the hours of 10 a.m. and 4 p.m. (excepting Saturdays). Copy of the bills of quantities may be obtained, together with a form of tender, by depositing with Mr. W. E. Watkins, Secretary, County Hall, Ipswich, before 12 noon on September 14, the sum of 2*l.* (cheques should be made payable to "W. E. Watkins").

NO DATE.—**Bartley.**—ALTERATIONS.—Tenders are invited for certain alterations at the New Inn, Bartley, near Lyndhurst, for the Lion Brewery, Winchester, Ltd. Plans may be seen at the New Inn, Bartley, and bill of quantities and further particulars obtained from Mr. J. Ashton Sawyer, architect, 59, High-street, Winchester, upon depositing 1*l.*

NO DATE.—**Leeds.**—SCHOOL EXTENSION.—Extension of the Leeds Middle-Class School. Names to Mr. W. S. Braithwaite, Architect's Department, Education Offices, Leeds; or to Mr. James Graham, Secretary for Higher Education, Education Offices, Leeds.

NO DATE.—**Westhoughton.**—SHOPS.—Tenders invited for erecting three shops at Westhoughton. Particulars to be obtained from Mr. Albert Suddell, architect, Westhoughton.

NO DATE.—**Whitby.**—RESIDENCE.—Proposed summer residence, Ruswarp-lane, Whitby, for Dr. J. E. Harburn, of Buxton. Names to Mr. Harold G. Walker, architect, Golden Lion-chambers, Whitby, who will supply quantities.

ENGINEERING, IRON, AND STEEL.

SEPTEMBER 17.—**Stainsby Beck.**—BRIDGES.—North-Eastern Railway Directors invite tenders for the construction of three bridges, 30 ft. span, over the old River Tees, otherwise known as Stainsby Beck, situated between Thornaby and Newport. Plans and specifications may be seen, and detailed quantities and form of tender obtained, on personal application at the office of Mr. W. J. Cudworth, the Company's Engineer, at York.

SEPTEMBER 18.—**London.**—FEED-WATER HEATER.—Hackney Guardians invite tenders for feed-water heater and other work required at the Workhouse, Sidney-road, Homerton, N.E. Specification, conditions of contract, drawings (as prepared by Mr. L. J. Todd, Consulting Engineer, of 25, Brooke-road, Stoke Newington, N.), form of tender, and order to view the site may be obtained from Mr. Frank R. Coles, Clerk to the Guardians, Clerk's Office, Hackney Union, Homerton, N.E.

SEPTEMBER 18.—**Portsmouth.**—IRON AND STEEL WORK, BRICKS, ETC.—Portsmouth Guardians invite tenders for the supply of iron and steel work, bricks, etc., and timber, in connexion with the extension of the mill ward at the Workhouse, as per specifications shown on tender forms, to be obtained on application at the Guardians' Offices, Portsmouth.

SEPTEMBER 19.—**London.**—WATER-HEATER REPAIRS.—St. Pancras Guardians invite tenders for the overhauling and putting into working order of the water-heater at the St. Pancras Infirmary (South), Pancras-road, N.W. Forms of tender may be obtained of Mr. Alfred A. Millward, Clerk to the Guardians, Town Hall, Pancras-road, N.W.

SEPTEMBER 23.—**Ashton-under-Lyne.**—LANTERNS AND PILLARS.—The Lighting Committee invite tenders for the supply of thirteen medium-sized lanterns and pillars, particulars of which can be had on application to the Lighting Superintendent at his office, Market Hall, Ashton-under-Lyne.

SEPTEMBER 24.—**Glin, Co. Limerick.**—BOILER.—Glin District Schools Board of Management invite tenders for supplying, erecting, and putting in working order a boiler, according to specification prepared by Mr. James D. Leahy, C.E., Newcastlewest,

County Limerick, a copy of which may be had on application to Mr. John Conway, Clerk to Board.

SEPTEMBER 25.—**Castleton.**—RAILWAY WIDENING, ETC.—Directors of Lancashire and Yorkshire Railway invite tenders for the widening of a portion of the railway between Castleton and Rochdale, and the construction of a timber carriage-shed. Plans can be seen, and copies of tender, quantities, and specification obtained, on application at the Engineer's Office, Hunt's Bank, Manchester.

SEPTEMBER 28.—**Hatfield Moor.**—LIGHT RAILWAY.—The Axholme Joint Railway Committee invite tenders for the construction of the Hatfield Moor extension light railway, about five miles long, commencing at Epworth Station on their Axholme Joint Line, and terminating near the Peat Moss Works. Plans may be seen, and specification, detailed quantities, and form of tender obtained, on personal application at the office of Mr. W. J. Cudworth, Engineer's Office, North-Eastern Railway, York.

SEPTEMBER 30.—**Dundee.**—CABLES.—Corporation of Dundee Electricity Committee invite tenders for supplying and laying extra high-tension and low-tension mains, new Carolina Port generating-station. Copy of general conditions, specifications, and forms of tender, together with drawings, may be had on application to Mr. H. Richardson, M.Inst.E.E., Engineer-in-Chief, Corporation Electricity Supply Works, Dudhope Crescent-road, Dundee, on deposit of a sum of 3*l.* 3s., and of 1*l.* 1s. for each extra copy, if required.

✱ SEPTEMBER 30.—**Swansea.**—HEATING.—The Swansea Education Committee invite tenders for the engineering work in installing a low-pressure hot-water heating apparatus in the Plasmarl Council School, Swansea. For further particulars refer to an advertisement in this issue.

OCTOBER 1.—**Winnipeg, Canada.**—HYDRO-ELECTRIC EQUIPMENT.—The Chairman of the Board of Control, Winnipeg, Canada, invites tenders for the construction of the general works, and for the supply and erection of the various portions of the equipments for the hydro-electric works and station at Point du Bois, for a transmission line between Point du Bois and Winnipeg, and for a receiving transformer station in Winnipeg. Copies of the instructions to bidders, plans, specifications, and forms of tender may be obtained at the Power Engineer's Office, Carnegie Library Building, Winnipeg, or may be examined at the offices of *Engineering*, 35 and 36, Bedford-street, Strand, London, W.C.

OCTOBER 7.—**Kirkcaldy.**—DOCK GATES AND SWING-BRIDGE.—Corporation of Kirkcaldy invite tenders for the construction and erection, at Kirkcaldy, of a pair of 50-ft. steel dock gates, and a swing-bridge of 50-ft. span. The drawings are exhibited at the offices of Messrs. Hodges & Bennett, 113, Cheapside, London, E.C., from whom copies may be obtained at a cost of 2*l.* 5s., and the specification and tender forms can be obtained free on application to the Town Clerk, Kirkcaldy.

NO DATE.—**Swansea.**—PUMPING ENGINES, ETC.—Swansea Harbour Trustees invite designs and tenders for supplying, delivering, and erecting at the King's Dock, Swansea:—Cross-coupled compound surface-condensing hydraulic pumping engines, steel Lancashire boilers, and accumulators. Forms of and instructions for tender can be obtained on application to Mr. Talfourd Strick, Clerk, Harbour Offices, Swansea, on payment of 5*l.* 5s.

MISCELLANEOUS.

SEPTEMBER 16.—**Merthyr Tydfil.**—IRONMONGERY, ETC.—Merthyr Tydfil Corporation invite tenders for the supply of (*a*) ironmongery goods, paving stones, etc. Forms of tender may be obtained from the Borough Surveyor, Town Hall, Merthyr Tydfil.

SEPTEMBER 17.—**Wakefield.**—SCHOOL FURNITURE.—West Riding C.C. Education Department invite tenders for furniture required at the schools. Full particulars may be obtained from the Education Department (Elementary Branch), County Hall, Wakefield.

SEPTEMBER 18.—**Cawsand.**—REMOVAL OF HOUSE REFUSE.—St. Germans R.D.C. invite tenders for removing house refuse from houses in Cawsand and Kingsand, etc. Specifications may be seen at the office of Mr. Fred Et. Cleverton, Clerk, 4, Buckland-terrace, Plymouth.

SEPTEMBER 18.—**Glasgow.**—STREET NAME AND NUMBER PLATES.—Glasgow Corporation invite offers for supplying and fitting up enamel street name and number plates in the Western and the St. Rollox Police Districts. Specifications and forms of tender may be had from Mr. Thomas Nisbet, Master of Works, City Chambers, Glasgow.

SEPTEMBER 18.—**Manchester.**—ASPHALTING.—Manchester Education Committee invite tenders for asphalting the playgrounds at the Mansfield-street Municipal School, Ardwick, and the Seymour-road Infants' Municipal School, Clayton. Bills of quantities (including specifications) may be obtained at the Education Offices, Deansgate, Manchester, on a deposit of 1*l.* 1s. in each case.

✱ SEPTEMBER 19.—**Herts.**—LIME TANKS, ETC.—The Guardians of St. Pancras invite tenders for the supply and fixing lime tanks, steam pipes, reducing valve, etc., at the schools of this parish at Watford, Herts. For further particulars see advertisement in this issue.

SEPTEMBER 23.—**Bangor.**—SCAVENGING.—Sanitary Committee of the Bangor City Council invite tenders for the house scavenging of the city. Specification and conditions may be seen at office of Mr. John Gill, City Surveyor, Bangor, each day, from 10 a.m. to 5 p.m. Saturday, 10 o'clock to 12 o'clock noon.

SEPTEMBER 25.—**Portrush.**—POST-OFFICE FITTINGS, ETC.—Board of Public Works invite tenders for the supply of fittings and furniture for a new Crown post-office at Portrush, County Antrim. Plans and specification can be seen at the Office of Public Works, Dublin, and at the Board of Works' Office, Queen's College, Belfast, where forms of tender may be obtained.

OCTOBER 3.—**Hull.**—FITTINGS, ETC.—Hull Corporation invite tenders for the supply of fittings and furniture at the new Law Courts, Town Hall extension, Hull. Copies of the drawings, specification, form of tender, and other particulars may be obtained from the City Treasurer, Town Hall, Hull, after September 15, upon payment of a deposit of 5*l.*

NOVEMBER 2.—**Portrush.**—LIGHTING.—Portrush U.D.C. invite tenders for a complete lighting installation by means of either electricity or gas. Specifications prepared by Mr. John Woodside, A.M.Inst.E.E., Ocean Buildings, Belfast, can be seen at the office of Council, Town Hall, Portrush.

NO DATE.—**Valparaiso, Chile.**—SCAVENGING, ETC.—The Municipality of Valparaiso (of Chile) invite tenders for cleansing the public streets and highways, also to collect and destroy the refuse, etc., from private houses. Particulars to be obtained from the Chilean Consulate, 133, Finsbury-pavement House, E.C.

PAINTING, etc.

SEPTEMBER 17.—**Brentford.**—CLEANING AND PAINTING.—The Guardians of the Brentford Union invite tenders for cleaning and painting the exterior wood and iron work at the infirmary and the schools at Isleworth. Specifications can be seen upon application at office of Mr. William Stephens, Clerk to the Guardians, Union Offices, Isleworth, W., where any further information can be obtained.

SEPTEMBER 17.—**Cardiff.**—PAINTING AND RENOVATING.—City Council of Cardiff invite tenders for painting and renovating the Roath Abattoirs, Cycle-street. Copies of specification and form of tender may be obtained at the office of Mr. W. Harpur, M.Inst.C.E., City Engineer, City Hall.

SEPTEMBER 17.—**Machen.**—PAINTING.—Tenders are invited for painting and colouring Adullam Congregational Church, Machen. Specification of work and particulars to be had of Mr. David Williams, carpenter, Machen.

SEPTEMBER 17.—**Royton.**—PAINTING.—Royton U.D.C. invite tenders for painting and decorating of Town Hall, market, etc. The specification may be obtained on application at the office of Mr. Thos. Bleasdale, Clerk to the Council, Town Hall, Royton, on payment of a deposit of 10s. 6d.

SEPTEMBER 18.—**Ashton-under-Lyne.**—PAINTING.—Ashton-under-Lyne Corporation Electricity Committee invite tenders for painting boiler house and destructor house roofs and other decorator's work in the offices at the Electricity Works, Wellington-road, and also for painting the arc lamp columns. Specifications and full particulars can be obtained on application at the Electricity Works, Wellington-road, Ashton-under-Lyne.

SEPTEMBER 18.—**Liverpool.**—PAINTING.—Select Vestry of Parish of Liverpool invite tenders for painting (according to a specification, which may be seen at office of Mr. H. J. Hagger, Vestry Clerk, Parish Offices, Brownlow-hill, Liverpool) of the wood and iron work of the buildings in Westminster-road, Kirkdale, formerly known as the Industrial Schools.

SEPTEMBER 24.—**Brighton.**—PAINTING.—Brighton Guardians invite tenders for painting the external and internal of the parochial offices, Prince's-street, Brighton. Copy of specification, conditions of contract, form of tender, together with all information, may be obtained on application to Mr. E. Wright, Surveyor for the Guardians, Parochial Offices, Prince's-street, Brighton.

ROADS, SANITARY, AND WATER WORKS.

SEPTEMBER 16.—**Great Burstead.**—DRAINS, ETC.—Great Burstead New Burial Ground Committee invite tenders for providing and laying of about 400 yds. of 3-in. subsoil drains, the forming of paths, and other incidental work at the New Burial Ground. Plans may be seen, and a copy of the specification obtained, from Mr. R. J. W. Layland, Surveyor, Billericay.

SEPTEMBER 16.—**Seaford.**—CARRIAGEWAY REPAIR.—Seaford U.D.C. invite tenders for repairing the carriageway of Firle-road, within their district. Plan and specification may be seen at the office of the Surveyor, 3, Clinton-place, Seaford, and bill of quantities and form of tender obtained on application.

SEPTEMBER 16.—**Whitley.**—STORM-WATER SEWER, ETC.—Whitley and Monkseaton U.D.C. invite tenders by schedule of prices for providing and laying about 430 lin. yds. of 21-in. and 24-in. pipe storm-water sewer, with manholes, etc., on the Links Estate, Whitley. Plans and specification may be seen, and forms of tender obtained, on application to Mr. John Moor, Surveyor, at his office, Council-buildings, Whitley Bay, R.S.O., between the hours of 9 and 10 a.m. and 4 and 5 p.m. (Saturdays excepted), of whom all information can be obtained.

SEPTEMBER 17.—**Billericay.**—SEWERS.—Billericay Guardians invite tenders for the laying of new sewers at the Union House, Billericay, according to plans and specifications prepared by Mr. Walter J. Wood, of 26, Alexandra-street, Southend-on-Sea, which can be seen at the Union House, Billericay.

SEPTEMBER 21.—**Levenshulme.**—ROAD WORKS.—Levenshulme U.D.C. invite tenders for the reconstruction of Albert-road by substituting tar-macadam for sett paving, and the paving of channels and crossings in the Council's district. Specifications and bills of quantities and further particulars may be obtained from the Council's Surveyor, Mr. James Jepson, Guardian-chambers, Tiviot Dale, Stockport, on payment of 3*l.* 3s.

SEPTEMBER 21.—**Leyland.**—SEWAGE OUTFALL WORKS, ETC.—Leyland U.D.C. invite tenders for the construction of precipitation tanks, chambers, conduits, roadways, subsoil drainage, and other works at the sewage farm. Drawings and specifications may be seen, and the bill of quantities obtained (on payment of 2*l.* 2s), at the office of Mr. Wilkinson, Surveyor to the Council, Public Hall, Leyland; or at the office of the Engineer, Mr. William Wrennall, 9, Harrington-street, Liverpool.

SEPTEMBER 23.—**Bournemouth.**—CAST-IRON OUTFALL, ETC.—Bournemouth T.C. invite tenders for providing and laying new 42-in. cast-iron outfall, etc. Full particulars, forms of tender, and specification can be obtained on payment of 1*l.* 1s. from Mr. F. W. Lacey, Borough Engineer and Surveyor, Municipal Offices, Bournemouth, where the drawings may also be seen.

SEPTEMBER 23.—**Clackmannan.**—DRAINAGE.—Clackmannanshire C.C. invite tenders for the construction of septic tanks and bacterial filters, of concrete, with grit, overflow, and outlet chambers, and other relative work, at Mary Bridge, together with the laying of about 2,700 lin. yds. of intercepting sewers, varying in diameter from 6 in. to 15 in. Drawings may be seen at the office of Messrs. Wyllie & Blake, C.E., 219, St. Vincent-street, Glasgow, and copies of the specification and duplicate copies of the schedule of quantities may be obtained from them on payment of 1*l.*

SEPTEMBER 23.—**Hay Mills.**—PRIVATE STREET WORKS.—Yardley R.D.C. invite tenders for the making-up of Geraldine-road, Hay Mills, and Knowle-road, Greet. Plans, sections, specification, and conditions of contract can be seen, and bill of quantities and form of tender obtained, on application to Mr. Arthur W. Smith, the Engineer and Surveyor to the Council, at the Council House, Sparkhill, near Birmingham, on payment of a deposit of 2*l.* 2s. to Mr. Francis Ladbury Thompson Clerk of the Council.

✱ SEPTEMBER 24.—**Harlesden.**—ROAD-MAKING.—The Willesden U.D.C. invite tenders for the execution of certain road-making and paving works in Wrottesley-road, Selbon-avenue, and Springwell-avenue, Harlesden. For further particulars see advertisement in this issue.

SEPTEMBER 30.—**Grange-over-Sands.**—APPROACHES, ETC.—Grange-over-Sands U.D.C. invite tenders for the construction of approaches to a subway, footpaths, and a 6-in. sewer. Specifications and plans may be inspected and copies of the schedule of quantities and forms of tender may be obtained from Mr. Thomas Huddleston, Surveyor to the Council, Council Offices, Grange-over-Sands.

SEPTEMBER 30.—**Tyseley.**—SEWERS, ETC.—Yardley R.D.C. invite tenders for the provision and construction of sewers, etc., together with manholes, chambers, and other works appertaining thereto, at Tyseley and Greet, in accordance with plans, drawings, specification, and conditions of contract, which may be seen on and after the 19th inst. on application to the Engineer and Surveyor, Mr. Arthur W. Smith, at the Council House, Sparkhill, near Birmingham, between ten and one, and three and five (Saturdays ten and one). Specification, bill of quantities, and form of tender can be obtained on payment of a deposit of 3*l.* 3s. to Mr. Francis Ladbury Thompson, Clerk of the Council.

OCTOBER 1.—**Heathfield.**—PRIVATE STREET WORKS.—Hailsham R.D.C. invite tenders for levelling, metalling, channelling, and making good Alexandra-road, Prospect-road, and Upper Station-road, Heathfield. The plans and section may be seen at office of Mr. Edmund Catt, Clerk, Council Offices, 17, London-road, Hailsham, between the hours of 10 a.m. and 4 p.m. on week days (except Saturdays, 10 a.m. to 1 p.m.), and copies of the specification, bill of quantities, and form of tender may be obtained on deposit of 5s.

OCTOBER 3.—**Carlow.**—DRAINAGE, WATER SUPPLY, ETC.—Carlow Guardians invite tenders for the carrying out of a system of drainage, sewage disposal, high-pressure water supply, plumbing, the erection of eight sanitary annexes, conversion of existing privies and sanitary accommodation, etc., at the Carlow Workhouse, in accordance with plans and specifications prepared by Mr James O'Donnell, A.M.Inst.C.E., Engineer to the Board of Guardians. Forms of tender, etc., and copies of bills of quantities (the latter prepared by Mr. Geo. Metcalfe, College Park Chambers, Nassau-street, Dublin) can be obtained on payment of 3*l.* 3s. from Mr. Thos. F. Coyle, Clerk of the Union, Clerk's Office, Workhouse, Carlow.

✱ OCTOBER 4.—**Mayford (Surrey).**—DRAINAGE, ETC.—The London C.C. invite tenders for drainage and sanitary works, accommodation for sick cases, and new drinking supplies at the Industrial School at Mayford, Surrey. For further particulars refer to an advertisement in this issue.

NO DATE.—**Northampton.**—ROAD WORKS.—For making certain back roads and drains on the Wantage estate, No. 2. Names to Mr. M. H. Holding, architect, Corn Exchange, Northampton.

STONE, MATERIALS, AND STORES.

SEPTEMBER 17.—**Manchester.**—TROLLEY WIRE.—Manchester Corporation Tramways Committee invite tenders for the supply of hard-drawn copper trolley wire. Specifications and forms of tender may be obtained on application to Mr. J. M. M'Elroy, General Manager, Tramways Department, 55, Piccadilly, Manchester.

SEPTEMBER 17.—**Rochester.**—PAVING MATERIALS, ETC.—Rochester Corporation invite tenders for the supply of tools, Portland cement, curb and paving materials, etc.—Specifications and forms of tender can be obtained on application to Mr. William Banks, A.M.Inst.C.E., City Surveyor, Guildhall, Rochester.

SEPTEMBER 18.—**Christchurch.**—STONE.—Christchurch B.C. invite tenders for the supply of 370 tons of 2-in. Penmaenmawr stone. Further particulars may be obtained on application to Borough Surveyor's Office, Town Hall, Christchurch.

SEPTEMBER 18.—**London.**—RAILWAY STORES.—East Indian Railway Company invite tenders for the supply and delivery of laminated springs, india-rubber fittings, fittings for carriage and wagon underframes, etc., and copper pipes, as per specifications to be seen at the Company's offices, Nicholas-lane, London, E.C.

SEPTEMBER 19.—**Hatton.**—BUILDING MATERIALS.—The Committee of Visitors of the Warwick County Lunatic Asylum, Hatton, near Warwick, invite tenders for the supply of building materials for twelve months. Forms of tender may be obtained, and samples of materials used can be seen, at the above institution.

SEPTEMBER 19.—**Rhondda.**—LEAD AND COMPO PIPE, ETC.—Rhondda U.D.C. invite tenders for the supply of lead and compo pipe and block tin. Form of tender may be obtained on application to Mr. Octavius Thomas, Engineer and Gas Manager, Gas and water Offices, Pentre, Rhondda, Glam.

SEPTEMBER 21.—**Neath Abbey.**—STORES.—Directors of the Main Colliery Company Ltd., invite tenders for the supply of stores. Forms of tenders and all particulars can be obtained on application to the Neath Abbey Office of the Main Colliery Company, Ltd.

SEPTEMBER 24.—**Sheerness.**—ROAD MATERIAL.—Sheerness U.D.C. invite tenders for the supply of basalt or granite, Kent rag stone, and basalt or granite chippings. Forms may be obtained from Mr. Vincent H. Stallon, Clerk of the Council, Council Offices, Trinity-road, Sheerness.

SEPTEMBER 30.—**Sandgate.**—HIGHWAY MATERIALS.—Sandgate U.D.C. invite tenders for the supply of highway materials. Forms of tender may be obtained on application to Mr J. Shera Atkinson, Clerk to the Council, Council Offices, 51, High-street, Sandgate, Kent.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*DRAUGHTSMAN (BOARD OF AGRICULTURE)	Civil Service Commissioners	Not stated	Sept. 26
*GENERAL FOREMAN	Battersea Borough Council...	3*l*, 10s. per week	Oct. 1

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*JOINERY MANUFACTURER'S STOCK-IN-TRADE, TOOTING—On the Premises	H. W. Smith	Sept. 17
*BUILDERS' PLANT, FURNITURE, ETC., KENSINGTON—On the Premises	John W. Morley & Co.	Sept. 18
*QUARRY PLANT—At G. A. Watson & Co.'s Quarries, Doonagore	Matcham & Co.	do.
*PACKING CASE MAKER'S PLANT AND MACHINERY—Bury-st., St. Mary Axe, E.C.	R. Norman	Sept. 19
*BUILDING MATERIALS—At 1, Lawn-cottages, High-road, Barnet	Veryard & Yates	do.
*BUILDING SITE, 57, KNIGHTRIDER-STREET, E.C.—At the Mart	Norton, Trist, & Gilbert	Oct. 9
*PATENTS, ETC., FOR WOOD BLOCK PAVING—At 154, St. Saviour's-road, East Leicester ...	Miller & Haigh	No date.

PATENTS.—*Continued from page 299.*

19,038 of 1906.—E. SCHWANENBERG and A. RINNE: *Process for Hardening Artificial Stone formed of Hydrate of Lime and Filling materials.*

This relates to a process for hardening artificial stone consisting chiefly of hydrate of lime or a mixture of hydrate of lime with powdered limestone or dolomite with filling materials, by means of carbonic acid or gases containing carbonic acid according to which the hardening medium is heated to about 35° to 110° C., and is not saturated with water vapour, for the purpose of acting as a drier upon the pressed articles.

22,930 of 1906.—E. C. POOLE: *Ferro-concrete Pile Construction and Driving.*

This relates to that type of pile construction and work known as ferro-concrete—that is, armoured or reinforced piles, and consists in the combination of a portion of wood pile suitably pointed and shod or an iron or steel point, a vertical frame of iron or steel rods or angles attached to such wood pile, a casing of ferro-concrete slabs surrounding said frame, a removable dolly resting on said wood pile within said frame for driving the pile, and a filling of cement concrete to complete the pile and iron rods or the like built in the concrete for further reinforcement if required.

13,113 of 1907.—E. C. POOLE: *Drain, Sewer, and other Pipe Joints.*

This relates to a spigot and socket joint for drain, sewer, and other pipes, and consists in constructing the socket of the pipe with the crown cut away and the sides extended vertically (to provide for the insertion of jointing material), with an internal flange round the socket end (on which the invert of the next pipe rests to ensure true concentricity of the pipes), in constructing the spigot of a pipe with an external flange so formed that when the spigot is placed in the socket of the next pipe the spigot will longitudinally couple with the socket, in cutting away the crown of the spigot (so as to obtain access to and inspection of the interior of the pipe and joint), and in providing a cover to replace the removed section of the spigot.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 28.—By GUY & SON (at Hailsham).

Chiddingly, Sussex.—The Peaks Farm and pasture land, 208 a. 3 r. 33 p., f.	£4,135

August 30.—By SANDERS & SON (at Barnstaple).

Barnstaple, Devon.—Freehold farms and accommodation land, 450 a. 3 r. 20 p.	7,603

By GILLART & SONS (at Aberdovey).

Aberdovey, Merioneth.—The Trefddian Estate, farms and building land, 1,176 a., f. (in lots)	16,088

By PYKE, POWESLAND, & SON (at Bradworthy).

Bradworthy, Devon.—The Forda Estate, 152 a., f.	1,300

September 4.—By JAMES W. COADE.

Torquay, Devon.—Park-pl., f.g.r. 4*l*. 10s., reversion in 18 yrs.	400
Maidenhead, Berks.—Ray Mead-av., f.g.r. 12*l*., reversion in 57 yrs.	300

By HOLSWORTH & HUCKETT.

Stamford Hill.—97, Darenth-rd., u.t. 74½ yrs., g.r. 10*l*., e.r. 60*l*.	555

By SEALE, SWAN, & SEALE.

Oxted, Surrey.—Woodhurst-pk., Hill Brow, f., p.	£1,500
East Hill-rd., freehold detached house, y.r. 75*l*.	1,200
Westerham, 1, 2, 3, and 4, Camden-villas, f., w.r. 83*l*. 4s.	1,025

By R. B. SIM & SON.

Bow.—63, Eglington-rd., f., w.r. 32*l*. 10s.	320
24, Vernon-rd., f., w.r. 33*l*. 16s.	370
Forest Gate.—26, Sebert-rd., f., e.r. 32*l*.	430

Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

MEETINGS.

SATURDAY, SEPTEMBER 14.

Incorporated Association of Municipal and County Engineers.—Midland District Meeting at Bilston.

MONDAY, SEPTEMBER 16.

Sanitary Inspectors' Association—Annual Conference opens at Llandudno.

Institute of Sanitary Engineers.—Opening sessional meeting at the Holborn Restaurant. 7.30 p.m.

Royal Sanitary Institute.—Dr. J. Priestley on "Sanitary Law." 7 p.m.

WEDNESDAY, SEPTEMBER 18.

Royal Sanitary Institute.—Dr. J. Priestley on "Sanitary Law." 7 p.m.

Provident Institution of Builders' Foremen and Clerks of Works.—Ordinary meeting of the members. 8 p.m.

FRIDAY, SEPTEMBER 20.

Royal Sanitary Institute.—Dr. J. Priestley on "Sanitary Law." 7 p.m.

SATURDAY, SEPTEMBER 21.

Royal Sanitary Institute.—Inspection and demonstration at Wimbledon Sewage Works at about 2.45 p.m.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, and Canada 21s. 8d. (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 26s. per annum.

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PRICES CURRENT OF MATERIALS.

. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.			
Hard Stocks	1	7	0	per 1000 alongside, in river.		
Bough Stocks and Grizzles	1	6	0	,,	,,	,,
Picked Stocks for Facings	2	10	0	,,	delivered.	
Flettons	1	6	0	,,	at railway depot.	
Red Wire Cuts	1	14	0	,,	,,	,,
Best Fareham Red	3	12	0	,,	,,	,,
Best Red Pressed Ruabon Facing..	5	0	0	,,	,,	,,

BRICKS, &c. (*continued*).

	£	s.	d.			
Best Blue Pressed Staffordshire	3	15	0	per 1000, at railway depôt.		
Do. Bullnose	4	0	0	,,	,,	,,
Best Stourbridge Fire Bricks	3	14	0	,,	,,	,,
GLAZED BRICKS.						
Best White and Ivory Glazed Stretchers	12	0	0	,,	,,	,,
Headers	11	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	16	0	0	,,	,,	,,
Double Stretchers	19	0	0	,,	,,	,,
Double Headers	16	0	0	,,	,,	,,
One Side and two Ends	19	0	0	,,	,,	,,
Two Sides and one End	20	0	0	,,	,,	,,
Splays, Chamferred, Squints	20	0	0	,,	,,	,,
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	14	0	0	,,	,,	,,
Double Stretchers	15	0	0	,,	,,	,,
Double Headers	14	0	0	,,	,,	,,
One Side and two Ends	15	0	0	,,	,,	,,
Two Sides and one End	15	0	0	,,	,,	,,
Splays, Chamferred, Squints	14	0	0	,,	,,	,,
Second Quality White and Dipped Salt Glazed	2	0	0	,,	less than best.	

	s.	d.	
Thames and Pit Sand	7	0	per yard, delivered.
Thames Ballast	5	6	,, ,,
Best Portland Cement	23	0	per ton, ,,
Best Ground Blue Lias Lime	19	0	,, ,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1	8½	,, ,,
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	1	,, ,,
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	2½	,, ,,

	s.	d.	
Ancaster in blocks	1	10	per ft. cube, deld. rly. dep't.
Beer ,,	1	6	,, ,,
Greenshill ,,	1	10	,, ,,
Darley Dale in blocks	2	4	,, ,,
Red Corsehill ,,	2	2	,, ,,
Closeburn Red Freestone	2	0	,, ,,
Red Mansfield ,,	2	4	,, ,,

YORK STONE—*Robin Hood Quality.*

Scappled random blocks	2	10	,, ,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	8	per ft. super.
6 in. rubbed two sides ditto, ditto	2	6	,, ,,
3 in. sawn two sides slabs (random sizes)	0	11½	,, ,,
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½	,, ,,
in. to 2 in. ditto, ditto	0	6	,, ,,

STONE (*continued*).

	s.	d.	
HARD YORK—			
Scappled random blocks.	3	0	per ft.cube, deld. rly.dept.
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	8	per ft. super. ,,
6 in. rubbed two sides ditto	3	0	,, ,,
3 in. sawn two sides slabs (random sizes)	1	2	,, ,,
2 in. self-faced random flags	0	5	,, ,,

SLATES.

In. In.	£	s.	d.	
20×10 best blue Bangor	13	2	6	per 1000 of 1200 at r. d.
20×12 ,, ,,	13	17	6	,, ,,
20×10 first quality ,,	13	0	0	,, ,,
20×12 ,, ,,	13	15	0	,, ,,
16×8 ,, ,,	7	5	0	,, ,,
20×10 best blue Portmadoc	12	12	6	,, ,,
16×8 ,, ,,	6	12	6	,, ,,
20×10 best Eureka unfading green	15	17	6	,, ,,
20×12 ,, ,,	18	7	6	,, ,,
18×10 ,, ,,	13	5	0	,, ,,
16×8 ,, ,,	10	5	0	,, ,,
20×10 permanent green	11	12	6	,, ,,
18×10 ,, ,,	9	12	6	,, ,,
16×8 ,, ,,	6	12	6	,, ,,

TILES.

	s.	d.	
Best plain red roofing tiles	42	0	per 1000 at rly. depôt.
Hip and Valley tiles	3	7	per doz. ,,
Best Broseley tiles	50	0	per 1000 ,,
Do. Ornamental tiles	52	6	,, ,,
Hip and Valley tiles	4	0	per doz. ,,
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	,, ,,
Do. Ornamental do.	60	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	0	,, ,,
Best Red or Mottled Staffordshire do. (Peakes)	51	9	per 1000 ,,
Do. Ornamental do.	54	6	,, ,,
Hip tiles	4	1	per doz. ,,
Valley tiles	3	8	,, ,,
Best "Rosemary" brand plain tiles	48	0	per 1000 ,,
Best Ornamental tiles	50	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	8	,, ,,
Best "Hartshill" brand plain tiles, sand-faced	50	0	per 1000 ,,
Do. pressed	47	6	,, ,,
Do. Ornamental do.	50	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	6	,, ,,

WOOD.

BUILDING WOOD.	At per standard. £	s.	d.		£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13	10	0	...	15	0	0
Deals: best 3 by 9	13	0	0	...	14	0	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	0	0	...	12	0	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.			
Deals: seconds	1	0	0	less thn best.			
Battens: seconds	0	10	0	,, ,,			
3 in. by 4 in. and 2 in. by 6 in.	9	0	0	...	10	0	0
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	...	9	10	0
Foreign Sawn Boards—							
1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.			
¾ in.	1	0	0	,,			
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4	10	0	...	5	0	0
Seconds	4	0	0	...	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	...	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	...	3	10	0
Swedish balks	2	10	0	...	3	0	0
Pitch-pine timber (30 ft. average)	4	0	0	...	4	15	0

JOINERS' WOOD.	At per standard. £	s.	d.		£	s.	d.
White Sea: first yellow deals, 3 in. by 11 in.	24	0	0	...	25	0	0
3 in. by 9 in.	22	0	0	..	23	0	0
Battens, 2½ in. and 3 in. by 7 in.	16	10	0	...	18	0	0
Second yellow deals, 3 in. by 1 in.	18	10	0	...	20	0	0
,, ,, 3 in. by 9 in.	17	10	0	...	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	...	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	13	10	0	...	15	0	0
Battens, 2½ in. and 3 in. by 7 in.	11	0	0	...	12	0	0
Petersburg first yellow deals, 3 in. by 11 in.	21	0	0	...	22	10	0
Do. 3 in. by 9 in.	18	0	0	...	19	10	0
Battens	13	10	0	...	15	0	0
Second yellow deals, 3in. by 11in.	16	0	0	...	17	0	0
Do. 3 in. by 9 in.	14	10	0	...	16	0	0
Battens	11	0	0	...	12	10	0
Third yellow deals, 3 in. by 11 in.	13	0	0	...	14	0	0
Do. 3 in. by 9 in.	12	10	0	...	14	0	0
Battens	10	0	0	...	11	0	0
White Sea and Petersburg—							
First white deals, 3 in. by 11 in.	14	10	0	...	15	10	0
,, ,, 3 in. by 9 in.	13	10	0	...	14	10	0
Battens	11	0	0	...	12	0	0
Second white deals, 3 in. by 11 in.	13	10	0	...	14	10	0
,, ,, 3 in. by 9 in.	12	10	0	...	13	10	0
,, ,, battens	10	0	0	...	11	0	0
Pitch pine: deals	18	0	0	...	21	0	0
Under 2 in. thick extra	0	10	0	...	1	0	0
Yellow Pine—First, regular sizes	44	0	0	upwards			
Oddments	32	0	0	,,			
Seconds, regular sizes	33	0	0	,,			
Yellow Pine oddments	28	0	0	,,			
Kauri Pine—Planks, per ft. cube	0	3	6	...	0	5	0
Danzig and Stettin Oak Logs— Large, per ft. cube	0	3	0	...	0	3	6
Small ,, ,,	0	2	6	...	0	2	9
Wainscot Oak Logs, per ft. cube	0	5	6	...	0	6	0
Dry Wainscot Oak, per ft. sup. as inch	0	0	8½	...	0	0	1½
¾ in. do. do	0	0	7	,,		—	

WOOD (*continued*).

JOINERS' WOOD (*continued*)—	At per standard. £	s.	d.		£	s.	d.
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0	0	9	...	0	1	0
Selected, Figury, per ft. super. as inch	0	1	6	...	0	2	6
Dry Walnut, American, per ft. super. as inch	0	0	10	...	0	1	0
Teak, per load	17	0	0	...	22	0	0
American Whitewood Planks, per ft. cube	0	4	0	...	0	5	0
Prepared Flooring, etc.—	Per square.						
1 in. by 7 in. yellow, planed and shot	0	13	6	...	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	...	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	...	1	0	0
1 in. by 7 in. white, planed and shot	0	12	0	...	0	14	6
1 in. by 7 in. white, planed and matched	0	12	6	...	0	15	0
1¼ in. by 7 in. white, planed and matched	0	15	0	...	0	16	6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	...	0	13	6
1 in. by 7 in. ,, ,,	0	14	0	...	0	18	0
¾ in. by 7 in. white ,, ,,	0	10	0	...	0	11	6
1 in. by 7 in. ,, ,,	0	12	9	...	0	15	0
6 in. at 6d. to 9d. per square less than 7 in.							

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £	s.	d.		£	s.	d.
Rolled Steel Joists, ordinary sections	7	15	0	...	8	5	0
Compound Girders, ordinary sections	10	0	0	...	11	0	0
Steel Compound Stanchions	12	10	0	...	13	10	0
Angles, Tees, and Channels, ordinary sections	9	15	0	...	10	15	0
Flitch Plates	9	15	0	...	10	15	0
Cast Iron Columns and Stanchions including ordinary patterns	8	0	0	...	9	0	0

METALS.

	Per ton, in London. £	s.	d.		£	s.	d.
IRON—							
Common Bars	8	10	0	...	9	0	0
Staffordshire Crown Bars, good merchant quality	9	5	0	...	9	15	0
Staffordshire "Marked Bars"	11	0	0	...	—		
Mild Steel Bars	9	10	0	...	9	15	0
Hoop Iron, basis price	9	15	0	...	10	0	0
,, ,, Galvanised	17	10	0	...	—		
(*And upwards, according to size and gauge.)							
Sheet Iron Black—							
Ordinary sizes to 20 g.	10	0	0	...	—		
,, ,, 24 g.	11	0	0	...	—		
,, ,, 26 g.	12	10	0	...	—		
Sheet Iron, Galvanised, flat, ordinary quality—							
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	16	0	0	...	—		
Ordinary sizes to 22 g. and 24 g.	16	10	0	...	—		
,, ,, 26 g.	17	0	0	...	—		
Sheet Iron, Galvanised, flat, best quality—							
Ordinary sizes to 20 g.	19	0	0	...	—		
,, ,, 22 g. and 24 g.	19	10	0	...	—		
,, ,, 26 g.	21	0	0	...	—		
Galvanised Corrugated Sheets—							
Ordinary sizes 6 ft. to 8 ft. 20 g.	16	0	0	...	—		
,, ,, 22 g. and 24 g.	16	5	0	...	—		
,, ,, 26 g.	17	10	0	...	—		
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	13	0	0	...	—		
Best Soft Steel Sheets, 22 g. & 24 g.	14	0	0	...	—		
,, ,, ,, 26 g.	16	0	0	...	—		
Cut Nails, 3 in. to 6 in. (Under 3 in., usual trade extras.)	10	15	0	...	11	5	0

LEAD, &c.

	Per ton, in London. £	s.	d.		£	s.	d.
LEAD—Sheet, English, 3lb. and up.	23	5	0	...	—		
Pipe in coils	23	15	0	...	—		
Soil pipe	25	15	0	...	—		
Compo pipe	26	15	0	...	—		
ZINC—Sheet—					—		
Vieille Montagne ton	32	10	0	...	—		
Silesian	32	5	0	...			
COPPER—							
Strong Sheet per lb.	0	1	4	...	—		
Thin ,, ,,	0	1	5	...	—		
Copper nails ,,	0	1	3	...	—		
BRASS—							
Strong Sheet ,,	0	1	2	...	—		
Thin ,, ,,	0	1	3	...	—		
TIN—English Ingots ,,	0	1	11	...	—		
SOLDER—Plumbers' ,,	0	0	9	...	—		
Tinmen's ,,	0	0	11	...	—		
Blowpipe ,,	0	1	1	...	—		

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	1¾d. ,, ,,
21 oz. thirds	3¾d. ,, ,,
,, fourths	2¾d. ,, ,,
26 oz. thirds	4¼d. ,, ,,
,, fourths	3¼d. ,, ,,
32 oz. thirds	5d. ,, ,,
,, fourths	4¼d. ,, ,,
Fluted Sheet, 15 oz.	3¼d. ,, ,,
,, 21 oz.	4¼d. ,, ,,

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

¼ Hartley's	2½d. per ft. delivered.
⅛ ,,	2½d. ,, ,,
⅛ ,,	3d. ,, ,,
Figured and Oxford Rolled "Oceanic" Glass, white	4d. ,, ,,
Do. ,, tinted	5½d. ,, ,,

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes	per gallon	0	2	1
,, ,, ,, in barrels	,,	0	2	2
,, ,, ,, in drums	,,	0	2	4
Boiled ,, ,, in pipes	,,	0	2	3
,, ,, ,, in barrels	,,	0	2	4
,, ,, ,, in drums	,,	0	2	5
Turpentine in barrels	per gallon.	0	3	5
,, in drums	,,	0	3	7
Genuine Ground English White Lead	per ton	26	10	0
Red Lead, Dry	,,	24	10	0
Best Linseed Oil Putty	per cwt.	0	7	0
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.

	Per gallon. £	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for seats of Churches	0	14	0
Fine Elastic Carriage	0	12	6
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	16	0
Finest Pale Durable Copal	0	18	0
Extra Pale French Oil	1	1	0
Eggshell Flatting Varnish	0	18	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	6
Berlin Black	0	16	0
Knotting	0	10	0
French and Brush Polish	0	10	0

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*

ALDERSHOT.—For new Wesleyan Soldiers' Home at South Camp. Mr. R. Curwen, A.R.I.B.A., 149, Bishopsgate-street, Without, London, E.C.:—

W. L. Edgoose	£6,434 0 0	W. Wallis	£5,541 16 9
C. Castle & Son	6,040 0 0	H. W. Yates	5,526 0 0
G. Parker	5,867 0 0	H. Somerford & Son	5,503 0 0
J. Knight	5,690 0 0	Stephens, Bastow, & Co.	5,500 0 0
Crosby & Co.	5,677 0 0	Cæsar Bros.	5,379 0 0
F. Burton	5,650 0 0	J. Lawrance	5,379 0 0
C. Wall, Ltd.	5,631 0 0	G. Kemp	5,379 0 0
Thomas & Edge	5,621 0 0	W. J. Snuggs, Aldershot*	5,250 0 0
	5,550 0 0	Martin & Wells	5,249 0 0

AYLESBURY.—For extension of Congregational Sunday-schools, for the Committee. Mr. R. Eaton, Clerk of Works:—

Webster & Cannon	£2,478	Crook & Judd, Waddesdon*	£1,839 9
Mayne & Son	2,350		
G. & T. Cannon	2,175		

BEESTON.—For paving, etc., Waverley-avenue, for the Urban District Council. Mr. E. A. Bush, Surveyor to the Urban District Council. Quantities by the Surveyor:—

J. Hawley & Son	£287 10 6	C. Raynor	£218 3 0
S. Thumbs	260 0 0	Summerfield	215 1 2
Bower Bros.	244 0 0	Keeth & Walner, Nottingham	214 16 0
Cox & Co.	241 6 2		
Bennett	219 0 0		

BIRCHANGER (Somerset).—For erecting a new farmhouse, Combe Sydenham Hall Estate, Monksilver. Messrs. Andrew & Hosegood, architects and surveyors, Williton, Somerset:—

J. H. Spear	£1,113 0	W. H. Gamlin, Stawley, Wellington‡	£785 0
J. E. Fursland	829 0		
J. W. Burt & Sons	797 10		

‡ Accepted subject to slight alteration in specification.

COALPIT HEATH.—For additions and improvements to the Parish Church. Messrs. Lingen Barker, Son, & Ellis, architects, 3, Unity-street, Bristol:—

Marsh & Stone	£560 0	W. Foster	£435 0
Cowlin & Son	559 0	Curtis & Son	432 15
J. Browning	500 0	E. Love	404 0
H. Smith	472 0	Adams & Jeffries, Oldland*	375 0
E. Clarke	455 10		

DARTFORD.—For erecting a bakery, 93, Kent-road, for the Industrial Co-operative Society, Ltd. Mr. Thos. Wooler, 31, West-hill, Dartford:—

W. J. Nolls ..	£1,250 0 0	Ketteringloop Builders, Havelock-street, Kettering* ..	£915 12 6
J. Lonsdale ..	1,126 0 0		
J. E. Saunders	1,165 15 8		
T. Knight....	1,005 0 0		
R. & T. Butler	945 0 0		

DENVER (Norfolk).—For new offices, outbuildings, fencing, etc., to non-provided school, for the Trustees. Messrs. Lacey & Upcher, architects and surveyors, Norwich. Quantities by the architects:—

C. Roper	£180 0	E. J. Case	£127 0
W. White.....	155 8	G. Porter	123 10
R. Shanks	145 0	Jones, Sons, & Co.	118 10
T. & S. Dickerson.	141 0	J. W. Collins, Downham Market* ..	108 0
Tash & Langley ..	129 0		

GREETLAND. — For roadworks, Princess-street, North-street, and George-street, West Vale, for the Urban District Council. Messrs. R. Horsfall & Son, surveyors, 22A, Commercial-street, Halifax. Quantities by the surveyors:—

W. Barraclough, Brighouse,* 127l. 13s. 10d., manual work (paving).
Drinkwater & Schofield, Greetland,* setts, at 2s. 9d. per sq. yd.
J. Normanton & Sons, Ltd., Greetland, kerb, 12 in. by 8 in., 2s. 4d. per yd.; kerb. 12 in. by 6 in., 2s. 4d. per yd.; kerb, 10 in. by 8 in., 2s. 2d. per yd.; circular kerb, 3s. 6d. per yd.
J. Farrar & Sons, Ltd., Southowram,* dimension flags, 3s. 2d. per yd.; random flags, 3s. 1d. per yd.

KENDAL.—For constructing three circular filters, etc., at the Sewage Disposal Works for the Corporation. Mr. F. W. Oxbury, Borough Engineer and Surveyor, Town Hall, Kendal:—

J. W. Howie	£1,783 10 10	S. Johnson & Son, Salford*	£1,320 0 0
D. Hinchcliffe & Co.	1,626 0 0	R. Wooburn..	1,308 17 6

PENDOYLAN.—For erecting a house, for Mr. B. Parsons. Mr. W. Morgan, architect, 11, Bute-crescent, Cowbridge-road, Pontyclun:—

W. Morgan & E. Harris, Pendoylan*	£300 0	J. Morgan.....	£289 10
		W. McCarthy	285 5

RUABON.—For new school, chapel, etc., for the Building Committee. Mr. Sam Nicholas, architect, 12, Merlin-street, Johnstown, Ruabon:—

	Stone.	Terra-Cotta.	Ironwork, Girders, etc.
S. & J. Davies....	£2,074 0 0	£2,000 0 0	—
Watkin, Jones, & Son	1,945 10 0	1,847 0 0	—
S. Moss	1,882 0 0	1,822 0 0	—
J. Roberts	1,846 0 0	1,756 0 0	—
T. Ll. Davies, Rhos, Ruabon..	1,680 13 0	*1,626 13 0	£53 10 0

SWANSEA.—For the erection of the New County Court Offices:—

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A. & D. Jenkins ..	7,666 0 0	.... 21 12 3
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Stephens, Baston & Co., Ltd.....	4,978 0 0	.... —
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Pye, Parkingson, & Co., Ltd, Eversley-road, Sketty, Swansea*	4,250 6 9	.... 60 0 0

STRATFORD-ON-AVON.—For painting, etc., at premises, 50, Arden-street, for the Guardians. Mr. A. H. Callaway, architect, Union Chambers, Stratford-on-Avon:—

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Carpenter: W. H. Skene* .....
Slater: J. Gillespie* .....
Plasterer: J. Clark*.....
Plumbers: C. Duthie & Sons* ..
Painter: J. D. Watson* ..... } £2,858 10 7

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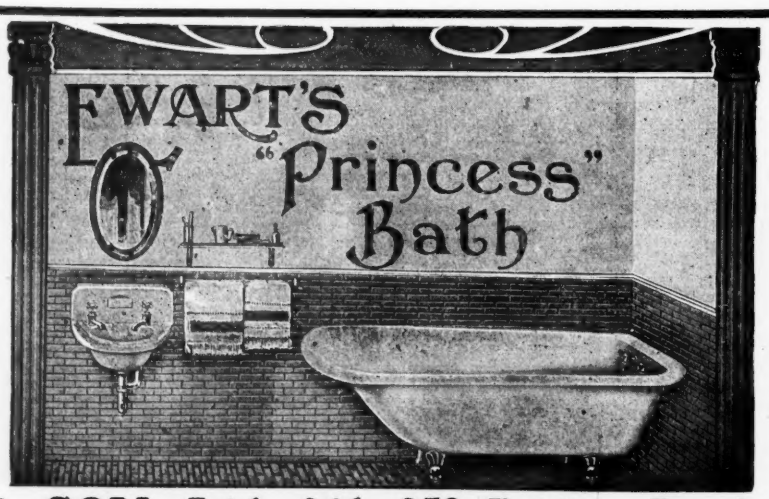

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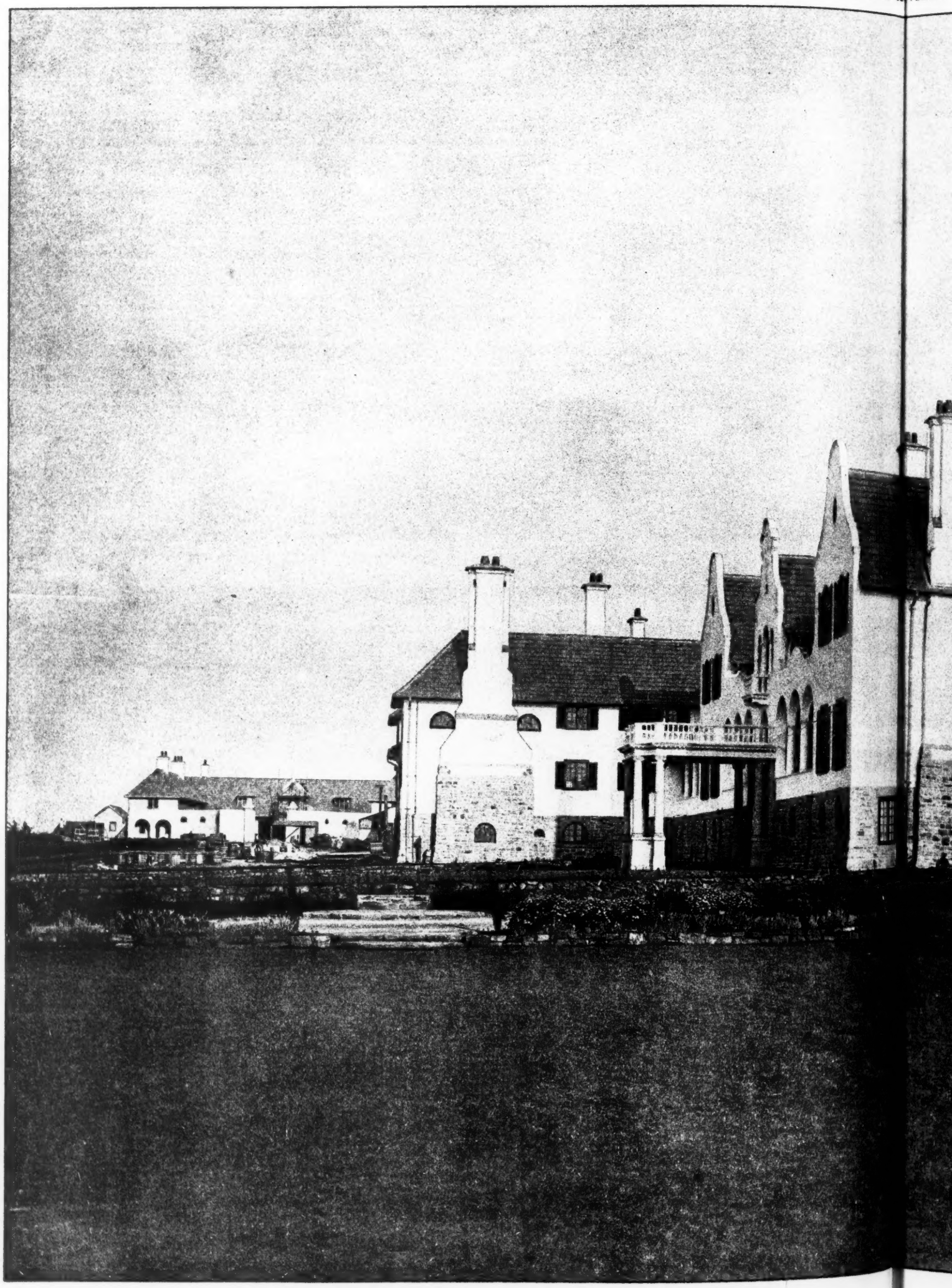

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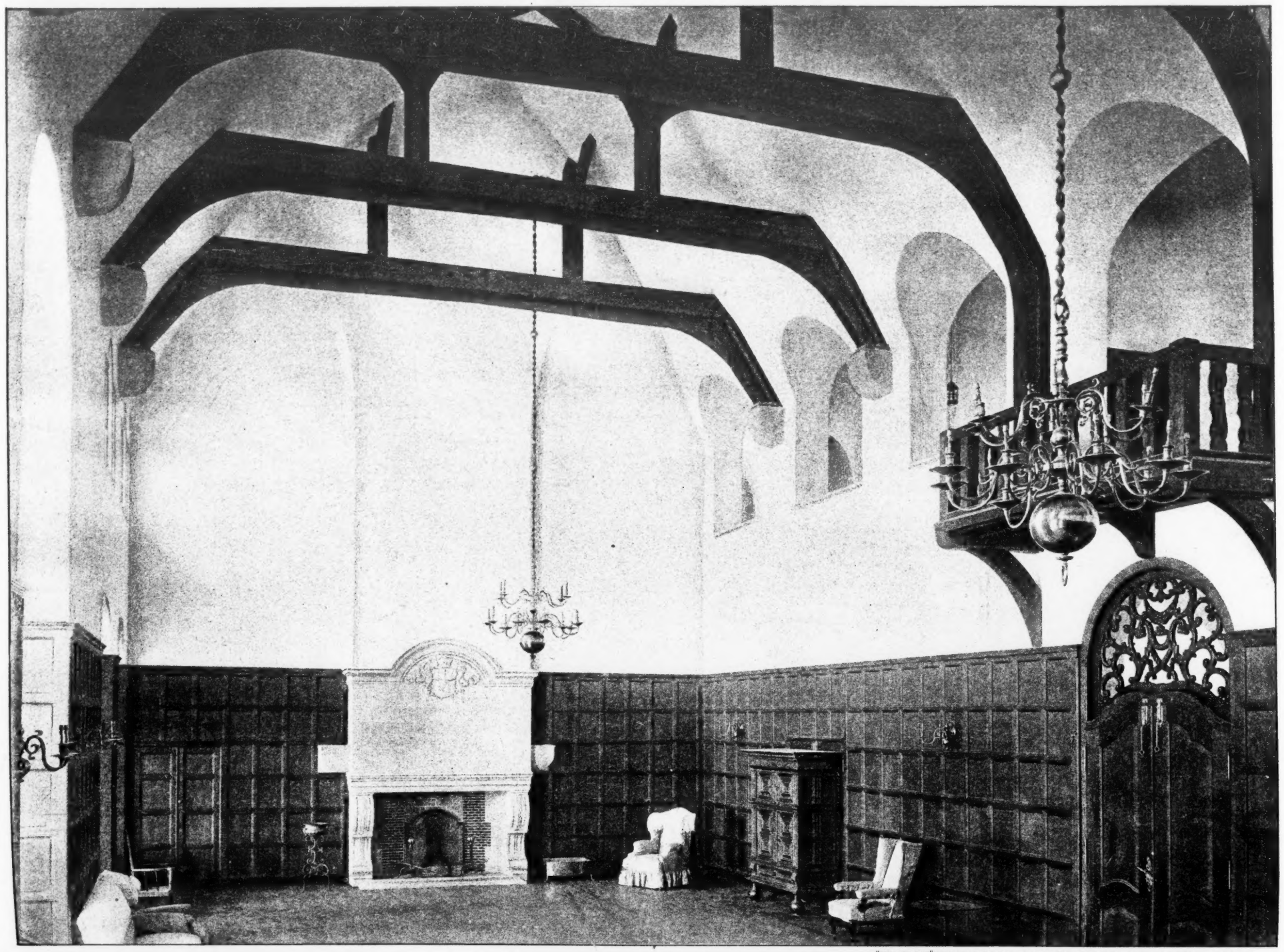

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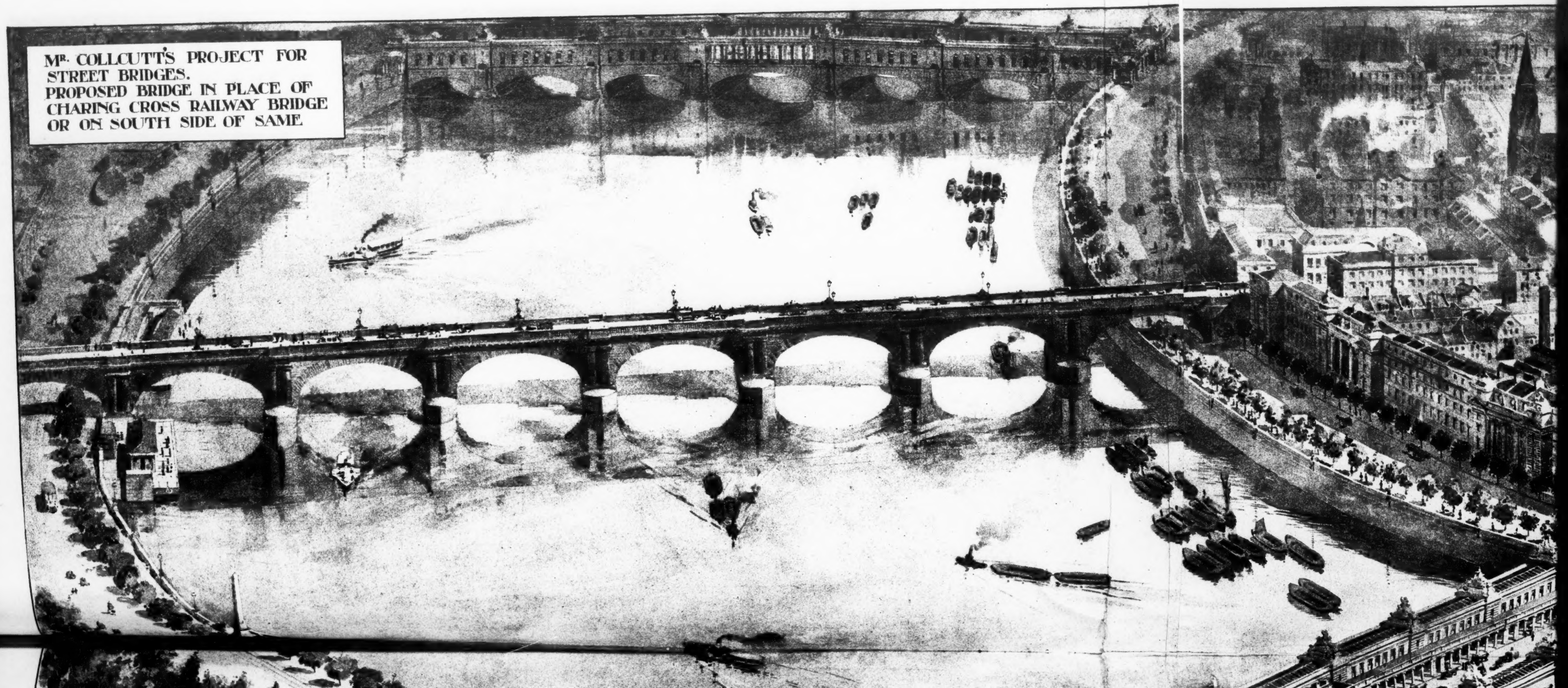

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